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AUTOMOTIVE INDUSTRIES

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Renault Modernizes Plant to Triple Output

Nash Gets Ready for 1949 Production

Argentina Angling for Italian Automobile Plants

New Trucks by Chevrolet and Diamond T

Canada's Turbo-Jet Test Facilities

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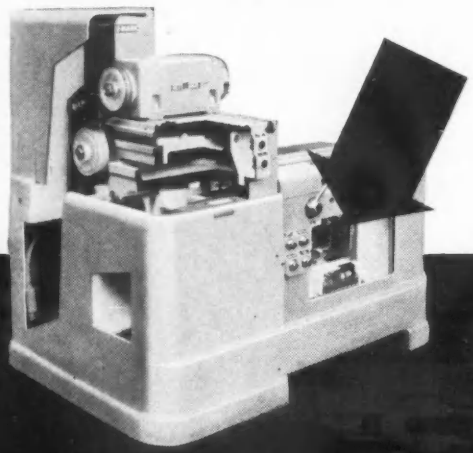
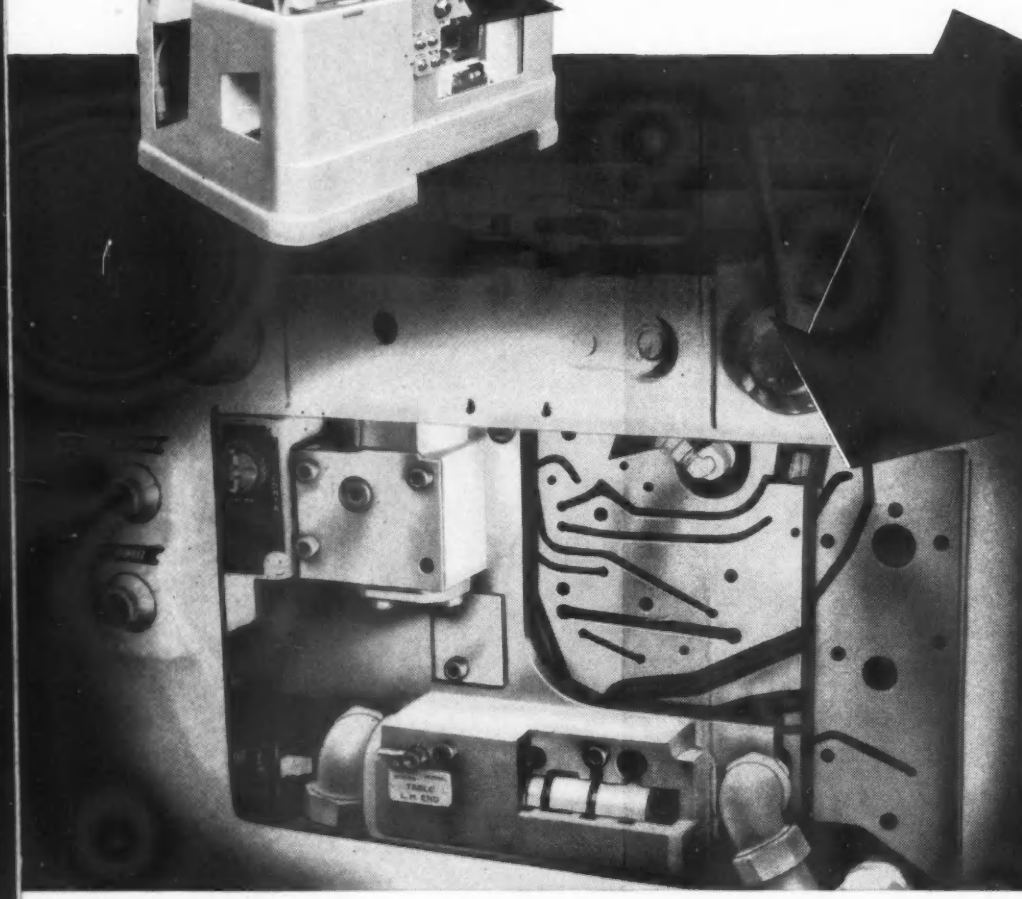
NEW, IMPROVED HYDRAULICS

mean *LOWER COSTS* with the New Heald Bore-Matics





. . .and that's only *part* of the story!

In every model of Heald's complete line of new Bore-Matics, you'll find *many* advanced design features that mean faster production, greater precision, and better finish—with easier operation, quicker setups, and less maintenance. In addition to the latest advances in *hydraulics*, Heald offers you such outstanding features as: rigid box-type bases—ventilated bridges — permanently lubricated boringheads — roll out power units — and many more. *All*, features that make the new Heald Bore-Matics today's best buy in precision finishing.

THE hydraulic system in Heald Bore-Matics is *completely new* — with features designed to help lower your production costs and improve the quality of your precision finishing operations. The universal core plate and unit valve constructon, pointed out in cutaways above, are just two of the *six* "hydraulic reasons" for specifying Bore-Matics on your production line. Here they are — each, a contribution to higher-than-ever machine efficiency.

1. Universal Type Core Plate — eliminates pipes and fittings, permits quick valve change-over for different machine cycles.

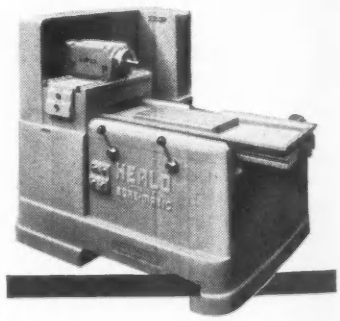
2. Unit Valve Construction — permits easier servicing. Interchangeable valves, accessible from front, can be quickly removed without disturbing piping.

3. Constant Feed Throttle — maintains constant, preset feeds, regardless of temperature changes. Assures continuous peak production with uniform accuracy and finish.

4. Isolated Reservoir and Pump — improves accuracy by minimizing heating and expansion of machine base. Low temperature hydraulic system circulates oil only as needed. New pump design permits faster cycles by speeding up table rapid traverse.

5. Improved Cylinder and Piston Design — give smoother table feed. Cast iron construction, with leak-proof piston rings. Special cylinder mounting minimizes table distortion.

6. Flared Steel Piping — provides tight, leak-proof joints, submerged in oil reservoir to prevent possibility of air bubbles.



Heald Bore-Matics are available in a complete range of sizes to meet all operating requirements — in single-end machines, like the Model 321 shown above, or in double-end models. Send for descriptive literature, or better still, let your nearest Heald representative show you how the new Bore-Matics can do a better job at less cost on your work.

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AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

July 15, 1948 Vol. 99, No. 2

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Cable Address ..... Autoland, Philadelphia

Member: Audit Bureau of Circulations; Associated Business Papers, Inc. AUTOMOTIVE INDUSTRIES is a consolidation of the Automobile (monthly) and the Motor Review (weekly), May, 1902; Dealer and Repairman (monthly), October, 1903; the Automobile Magazine (monthly), July, 1907, and the Horseless Age (weekly), founded in 1895, May, 1918.

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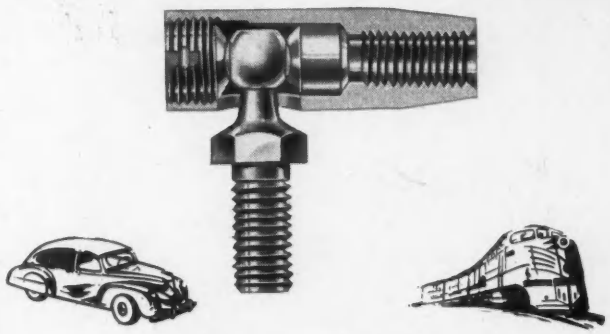

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In the products illustrated, and in scores of others, Tourek Standard Ball Joints contribute to simplification of design and improvement in performance. Special designs in ball joints are available to meet the demands of your particular specifications.

Large diversified batteries of the latest type 6-spindle automatics can assure you outstanding precision and values on your screw machine parts requirements.

Write for Tourek's 16-page illustrated catalog, containing complete specifications on 12 standard types in 54 sizes, as well as data on special types. Or, if you want prices on your screw machine product needs, send prints.

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Future SCRAP NEEDS to be Even Greater

Get In Scrap Metal, Plea to Auto Workers

Two automobile manufacturing firms Wednesday appealed to their dealers and employes to aid the production of automobiles by turning in scrap metal.

C. E. Wilson, president of the General Motors Corp., said that unless the flow of scrap to steel mills is increased, 1948 automotive production will suffer. He called on all G-M employes, dealers and plant managers to join the drive. The Packard Motor Car Co. has asked its dealers in 12 zones, including Milwaukee, to earn additional allotments of new cars by accumulating scrap.

As explained to GM's 365,000 employes 15,000 dealers and others, the purpose of the drive is "to get every pound of scrap metal out of the homes, farms, factories and other business places and into the steel mill furnaces as rapidly as possible. "Scrap metal is one of our most critical shortages," Wilson said in a message to employes. "The lack of it held production down in 1947. "Scrap metal drives were one of the greatest contributions made by civilians during the war to keep our wartime steel output up. Today, the economic importance of getting the scrap iron and steel into the mills is as great as the patriotic motives were during the war."

The General Motors president asked employes to use the regular collection agencies to get scrap metal flowing toward the mills, and added:

"The steel industry in this country requires 35 to 50 tons of scrap to produce 100 tons of finished steel. The present shortage of scrap arises from the fact that 100 million tons of steel went into making war supplies and lend-lease materials for our allies. This is the equivalent of three years' scrap needs of the steel industry. Very little of this steel has come back into the United States scrap market."

New York, N. Y.-(AP)-The steel industry must find additional scrap if it is to utilize the newly increased steel capacity, Iron Age, national metalworking weekly, said Wednesday. The publication added that scrap is more difficult to obtain today in large amounts than at any time in history.

The newspaper clipping reproduced above tells the story of the continued scrap shortage which faces American Industry.

Today's expanding economy is faced with growing shortages of iron, steel and other needed metals. Expanded capacity of mills, smelters and foundries is only part of the answer.

They cannot produce at full capacity without more usable scrap metal. Increased use of baled sheet metal scrap can help take up the "slack" in the scrap cycle . . . not only now, but in the years ahead.

If you are *not* baling your *sheet metal scrap* . . . plan to do so as soon as possible . . . to help provide your own supply of new metal in the future. There's a Galland-Henning Hydraulic Baler of proper size and capacity to meet your future baling needs. The important thing is to plan for it now. Write —

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AUTOMOTIVE INDUSTRIES
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High Spots of This Issue

How Renault Has Modernized its Plant to Triple Output

Production engineers have worked on the Renault design to an extent not common in Europe. A special plant built for the production of this four-passenger, rear-engined car, has been retooled with latest types of American and French production equipment. The results at Renault are revealed on page 24.

Argentina Makes Deal With Italian Car Maker

An agreement with Italy's newest automobile company has already been signed regarding making Argentina self-sufficient in automobile production. Although technical and engineering details are being kept secret, AUTOMOTIVE INDUSTRIES brings you special dispatches on the matter direct from Turin and Buenos Aires—on page 27.

Canada's Turbojet Test Facilities

A 2590 lb thrust turbojet engine designed and manufactured for the Royal Canadian Air Force has had its official test running. Called the Canadian Chinnook by its creators (A. V. Roe Canada Ltd.), the story of its major components begins on page 28.

Nash Prepares for 1949 Production

The Milwaukee body plant of Nash Motors Division in its advance changeover for 1949 models has installed a vast array of immense new presses. These and miles of new monorail conveyor systems, merry-go-round conveyor lines and use of unique scale models in visualizing changes in plant layout, are amply illustrated and described on page 32.

Flexible Transfer Machines

Packard Motor Car Co. has insisted upon adoption of integrated transfer machines flexible in design. This has eliminated the serious problem of product design becoming frozen. Just how adroitly cylinder heads and blocks are handled on Packard's flexible equipment makes informative reading, on page 34.

21 New Product Items And Other High Spots, Such As

Diamond T Co.'s new trucks in two series; Chevrolet's two forward-control truck chasses; Crosley's method of bonding brake linings; an unusual design British sport car; a new electric shifter; a passenger car installed with a gas turbine; a new low temperature rubber made by an "anti-freeze" method; and latest engineering features of the Tucker.

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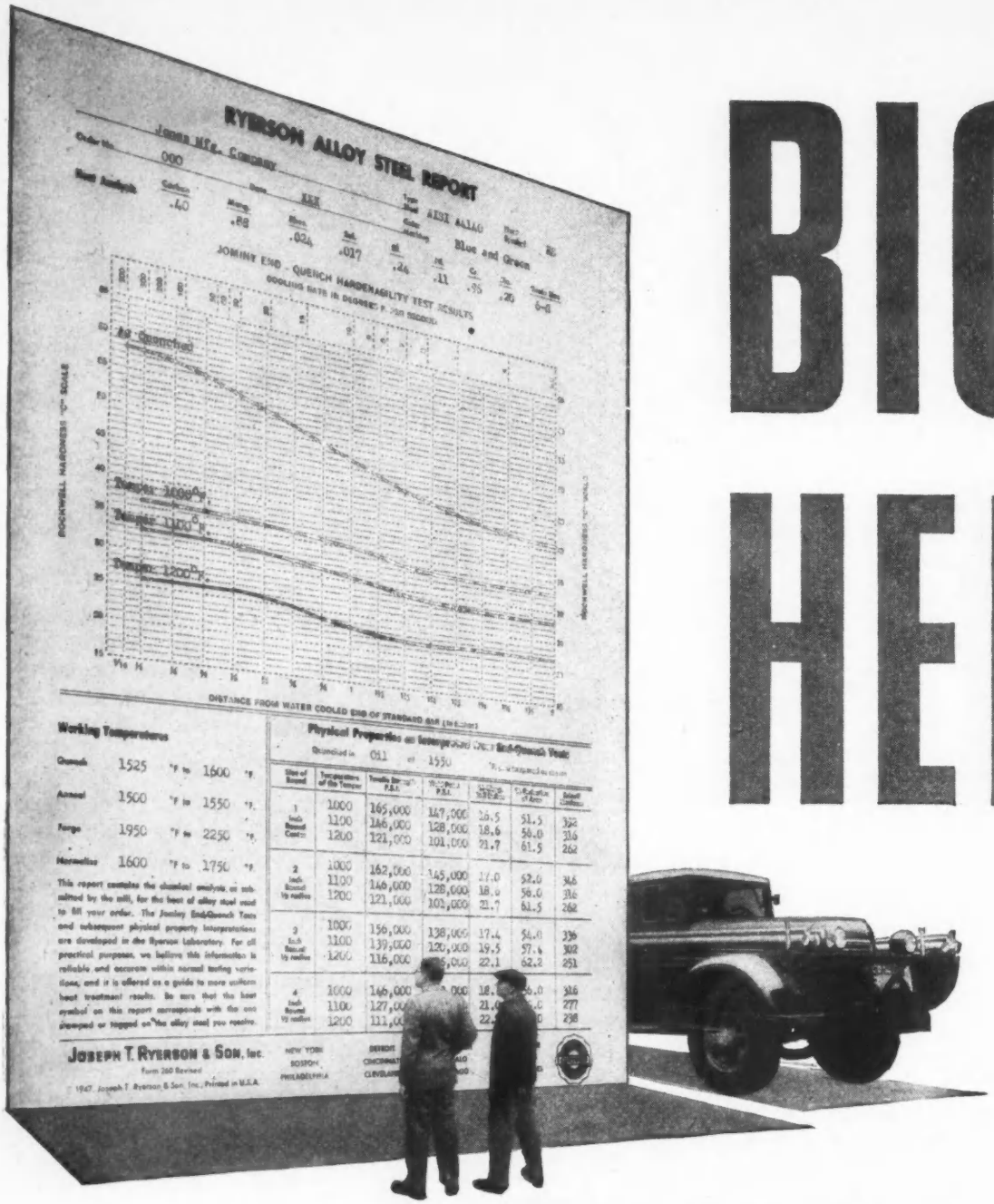

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Even the most experienced heat treaters call for the Alloy Reports that come with alloy steel from Ryerson stock. The Reports serve them as a time-saving guide to heat treatment procedure, andcheck against results.

But equally important is the help these reports give to men who specify and purchase alloy steel. They make it safe and sure to buy the modern way—on the basis of hardenability. They enable you to specify the strength you want to develop through heat treatment, and be certain of getting it from Ryerson.

Because we test every alloy heat in our stocks for hardenability, we can select bars that meet your specified performance requirements. And, because we record the interpreted test results on the Alloy Report (sent with the shipment) you have positive proof of the steel's ability to do your job.

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NEWS of the AUTOMOTIVE INDUSTRIES

Vol. 99, No. 2 July 15, 1948

First Half Year Output Tops 2.5 Million Vehicles

Although factory sales of motor vehicles in U. S. plants were the lowest in May for any month since September, 1946, production during the first half of this year was well above 2.5 million vehicles in the U. S. alone, and more than 2.6 million for the U. S. and Canada. Even if the second half year's production does not more than equal that of the first six months total, output for 1948 would still be ahead of last year. It is believed, however, that with danger of a coal strike averted, and with prospects of steel supply showing improvement later this year, the industry should exceed last year's production and quite possibly turn out 5.5 million units.

The one major hazard still clouding last half prospects is the amount of steel that may be diverted from automotive production to the armament program. At the moment there are no signs of any immediate drain on the materials stock pile for defense needs, but any recurrence of alarm over Russian intentions might accelerate implementation of tentative contracts already placed for trucks and combat vehicles. In a surprise move, Congress inserted into the recent draft law provisions which would empower the President to require producers of steel to make available to manufacturers having orders for steel products required by the armed forces sufficient material to enable them to fill those orders. Authority for government seizure is given in case a company refuses to comply with the priority given to such government orders. There is no immediate intention that the authority thus granted will be used, but it stands as a threat in case of an emergency.

New Nash to Appear October 1st

George W. Mason, president of Nash-Kelvinator Corp., has confirmed reports that his company will introduce its new model cars by Oct. 1. A letter to stockholders said that the factory changeover would take place late in August. A principal change in the Ambassador line will be the adoption of unit-frame construction, similar to that employed currently on the 600 series. Such a move could result in considerable saving in manufacturing costs to Nash since bodies for both series could be built on the same line during the start-up period, or at other times of low production. Most of the body panels of the two series are identical.

K-F Styling Change Not To Be Extensive

Although the Kaiser-Frazer Corp. is planning a moderate restyling revision of its current models later this year, the change will not be nearly so drastic as has been necessary for other manufacturers. In fact, K-F will be the first company to make further refinements on the modern styling which the company was one of the first to adopt in 1946. It is understood that the changes will consist principally of modifications in exterior trim and perhaps some overall lowering and smoothing out of body lines. K-F has one cost advantage over its competitors in that it did its major tooling job immediately after the war when costs were lower than they are at present, and, consequently, will not have to do any extensive retooling for the upcoming model change.

Tire Makers Boost Prices of Tires and Tubes

The recent wage increases granted the United Rubber Workers are rapidly being reflected in hikes in the prices of tires and tubes. Recently, the U. S. Rubber Co., boosted passenger car tire prices about six per cent, truck tires about five per cent, and inner tubes about six per cent. The price tags on Goodyear Tire and Rubber Co. passenger car tires are up about six per cent, and truck tires about five per cent. The prices of B. F. Goodrich Co. passenger car tires are up 4½ to six per cent; truck and bus tires, five per cent; and tubes, six per cent. The Firestone Tire and Rubber Co. has raised its tire and tube prices from five to 7½ per cent. The Seiberling Rubber Co. has also hiked the prices of its tires and tubes from 4½ to 7½ per cent.

AIRWAY FOR THE HIGHWAY

Designed by aeronautical engineers to sell between $500 and $750, the new Airway, developed by Airway Motors, Inc., San Diego, Calif., is powered by a 10-hp, air-cooled engine mounted in the rear, permitting a reported speed of 50 mph. Featuring no-clutch fluid drive, the car weighs 600 lb, has a 100-in. wheelbase and a 50-in. tread.

NEWS *of the* AUTOMOTIVE INDUSTRIES

Wage Hikes Boost Car Prices

Falling in line with recent wage increases, more automobile companies have boosted car and truck prices. The Kaiser-Frazer Corp. recently announced price increases on its passenger cars ranging from $23 to $169. The prices of the Willys-Overland Motors two and four wheel drive trucks and sedan delivery have been raised from $55 to $79. A Willys spokesman stated that a $1765 price tag had been set for the new sports phaeton Jeepster. GM raised truck prices, but has not as yet increased the tags on passenger cars. However, it is problematical how long it will hold the line in view of rising costs. Ford Motor Co. and Chrysler Corp.'s Dodge Div. have increased truck prices. Ford increases range from 4.5 per cent on the smallest series to 10.4 per cent on COE 1½ ton models. The prices of the Ford series F7 and F8 2½ and three-ton trucks show an average increase of 7.3 per cent over previous list prices, ranging from 5.4 per cent for the series F8 to 9.3 per cent for the series F7. Ford did not reduce the dealers traditional dealer discount in making the price increase on trucks as it did in the case of the 1949 Ford passenger car. Dodge raised prices on its models by $66 to $149. In both cases increases are attributed to higher labor and material costs.

The Ford Motor Co. of Canada, Ltd. has also announced that prices of its new Ford models have been increased 17.6 per cent, a considerably larger percentage than the nine per cent announced for the Ford line in the United States. It is believed that at least part of the reason for the much greater increase was that allowance was made for expected wage increases, and also possibly that restrictions on dollar exchange requiring many parts to be purchased in Canada has increased costs above what they would have been for U. S. made parts.

CIVILIAN BABY JET

Commercially available for non-military use, the new Model D5-1 jet engine, produced by the Aeromarine Co., Vandalia, O., develops a static thrust of 30 lb. Weighing 8¾ lb, it measures 6-3/16 in. in maximum diam by 51 in. in overall length.

K-F Program to Upgrade Workers to Foremen

The Kaiser-Frazer Corp. has instituted a comprehensive promotion-from-the-ranks program to select candidates for foreman positions. Initial selection is made through a screening process in each major department, with the final selection determined by aptitude tests, employment records, previous experience and recommendations of supervisors. Approved candidates are given training for two hours daily over a four-week period in company policies, organization, responsibilities of foremen, human relations, and production problems. It is believed that expansions and normal turnover will provide opportunity for trainees who successfully complete the course.

Chevrolet Starts Campaign To Increase Sales Force

All major automobile companies are currently engaging in active programs to strengthen their dealer organization against the day of keen competitive selling. Dealer sales staffs have been seriously weakened by the war and by the subsequent lush postwar period when trained sales personnel has not been needed to sell automobiles. Chevrolet is conducting a nation-wide sales managers' institute designed to instruct sales managers in selecting, hiring, training, and working with the right type of salesman required for a strong selling organization. Before the war approximately 24,000 salesmen were employed in Chevrolet dealerships, but the number today is only about 4000. The division hopes to get its sales force back to 60 per cent of prewar strength before the buyer's market returns and to level off at that point.

Continental Helps Develop Better Military Engines

As a result of experimental and development work for the U. S. armed services carried on by Continental Motors, new engines far superior to those used during the past war have been developed for tanks and heavy military vehicles, according to C. J. Reese, president.

SHIPMENTS OF COMPLETE AIRCRAFT AND AIRCRAFT ENGINES AND OTHER PRODUCTS OF THEIR PLANTS, 1948*

AIRCRAFT

	April	Four Months
Complete Aircraft	937	3,033
Military Aircraft		
Number of Planes	165	738
Civil Aircraft	772	2,295
Personal Planes		
Number	756	2,238
Value	$3,052,455	$9,778,736
Transport Planes		
Number	16	57
Value	$5,401,869	$17,093,477
Aircraft Parts—Value	$1,690,639	$7,667,042
All Other Products—Value	$2,895,797	$11,669,759
Total—Value of All Products	$13,040,760	$46,209,014

AIRCRAFT ENGINES

	April	Four Months
Military Engines		
Number of Engines	416	1,437
Value of Engines	$20,760,247	$71,584,963
Value of Parts	$4,841,175	$18,300,303
Civil Engines		
Number of Engines	975	3,854
Value of Engines	$3,220,452	$12,804,202
Value of Parts	$2,014,309	$7,707,264
Total—Engines	1,391	5,291
Total—Value of Engines	$23,980,699	$84,389,165
Total—Value of Parts	$6,855,484	$26,007,567
All Other Products—Value	$285,699	$517,372
Total—Value of All Products	$31,121,882	$110,914,104

*—Bureau of the Census and Civil Aeronautics Administration.

NEWS *of the* AUTOMOTIVE INDUSTRIES

LIMIT BEATER

This newly-designed cab-over-engine Kenworth truck, basically a Kenworth Model 522, has been especially engineered for use in states where the legal restrictions regarding length and weight are lower than normal. By using this tractor, an operator can haul a 34-ft semi-trailer in states where the limit of length is 45 ft overall.

Federal Truck Names Hammond President & Genl. Mgr.

The board of directors of the Federal Motor Truck Co. recently elected George H. Hammond as president and general manager to succeed Thomas R. Lippard, effective July 1. Mr. Lippard will remain with the company as a director. Mr. F. L. Ruddon, vice president and assistant general manager, and Mr. M. L. Burrell, director of purchases, were elected directors.

GM Parts Prices Up Average 5.9%

GM has increased prices of certain replacement parts an average of about 5.9 per cent. A price study had been in progress for two months prior to the increase. The price increase was the first major raise in parts prices by GM since the 15 per cent increase allowed by OPA in August, 1946. Including the latest increases, GM replacement parts have gone up in price only about 46 per cent since the fall of 1940, compared with an increase of 70 per cent in the consumer price index for the same period. GM replacement parts volume for the first five months of this year was 21 per cent above the same period last year on a dollar basis, and a spokesman estimates that the physical increase in volume would nearly approximate that figure.

AC Spark Plug Output at Daily Rate of 250,000

Automotive spark plug production at AC Spark is currently at the rate of 250,000 daily. In addition, the division's various plants produce aircraft spark plugs and more than 40 other different items in the automotive parts and accessory line. The company states that no automobile or truck is made today that does not use at least one component manufactured by AC. The ratio of spark plugs going into replacement market is about 2.5 to 1.

Truck Body Manufacturers Form Trade Association

Truck body manufacturers have formed a national organization to be called the National Truck Body Manufacturers Association, Inc. It is reported that the need of such an organization to present uniform information about the industry's steel requirements led to the organization. F. E. Hartwell of Elkhart, Ind. was elected president.

K-F to Establish Plant at Rotterdam, Holland

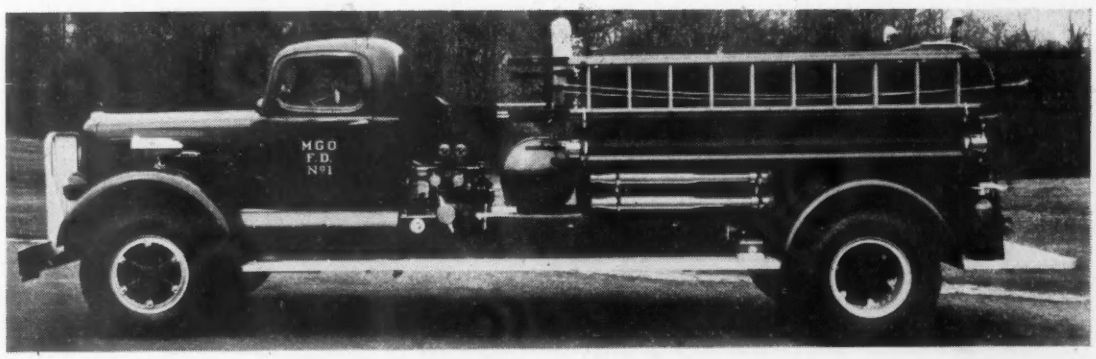
The first European K-F assembly plant will be established at Rotterdam, Holland, according to the Institute for Dutch-American Cooperation. The plant is expected to start operating near the end of this year with about 400 workers.

No Celebration Planned for 100 Millionth Vehicle

As reported previously in AUTOMOTIVE INDUSTRIES, there will be no national celebration to observe the building of the 100 millionth vehicle by the automobile industry when the event occurs this summer, possibly late in August. Manufacturers committees working through AMA have concluded that the time is not propitious for a celebration, even if it were possible statistically to determine the exact car which would represent the 100 millionth unit. A tentative plan is now under consideration for state celebrations commemorating the event early this fall with a national industry-wide dinner to be held in Detroit in October, at which leading figures in the industry would be present. However, the plan is not yet definite, and further details will be announced if and when the project is approved.

OIL FIRE FIGHTER

Developed by the National Foam System, Inc., Philadelphia, this new foam-producing fire-fighting, double-duty truck, can be operated by one man in fighting oil field fires. Each can be designed in capacities from 2500 gpm to 12,000 gpm of foam.



NEWS *of the* AUTOMOTIVE INDUSTRIES

Goodrich Opens New Research Center in Ohio

Making it possible to bring scientific discoveries to maturity three or four times faster than at present, a new, multi-million dollar research center was recently inaugurated at Brecksville, O. by the B. F. Goodrich Co. John L. Collyer, president of the company, said that the center is the most complete industrial workshop of science now in existence. Equipped with the latest scientific tools and equipment, the six buildings are located on a 261-acre site. In addition to crude and manmade rubber research, Goodrich will conduct intensive investigation in such fields as chemicals, plastics, agriculture, horticulture and the application of nuclear energy to rubber manufacturing. Atomic energy's usefulness and effects in rubber and related materials will be studied in one of the center's laboratories.

ADDED BY AUTOCAR

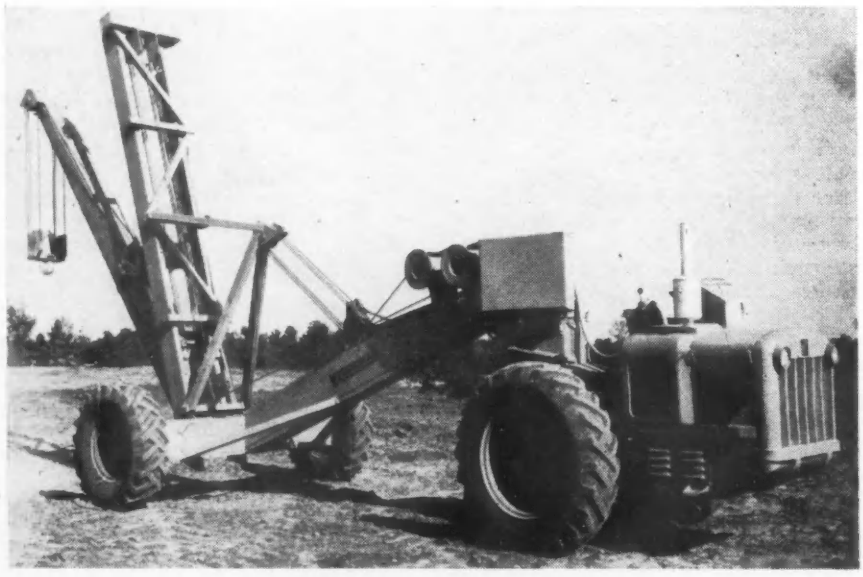
The Autocar Co. has added two new models, the C-75-T, shown above, weighing 35,000 lb GVW, and the C-95-T weighing 40,000 lb GVW. The C-75-T is powered by a six-cyl Continental R-6572 engine developing 189 hp; the C-95-T by a six-cyl Continental R-6602, developing 198 hp.

K-F Continues Buying Steel from Portsmouth

Although Kaiser-Frazer Corp. has sold its 200,000 shares in Portsmouth Steel Corp., its contract for the purchase of steel from the latter company will not be affected. Under the original agreement, K-F has the option of buying steel for a three-year period which ends July, 1949. The mill is required to sell K-F up to certain maximum quantities of specified steel products. K-F has been buying its maximum allowance of 7900 tons of slab and sheet steel a month and expects to continue.

Car and Truck Exports Fall Behind 1947

Tightened dollar exchange in foreign countries has resulted in passenger car and truck exports dropping below the level prevailing early last year. During the first four months of 1948, 80,317 cars were exported, compared with 86,163 during the same period of 1947. Latest countries to ban imports of American passenger cars are Singapore and the Federated Malay States. Argentina and Sweden took similar action a few months ago. Truck exports are down sharply from 93,791 the first four months of last year to 72,558 units during the same period of 1948. Passenger car exports this year represent 6.5 per cent of total car production, and trucks about 15.2 per cent.



SEVEN TON SHIFTER

A new lift-and-carry unit designed by R. G. LeTourneau, Inc., the Model EC-7 Tournacrane lifts loads weighing up to seven tons. Featuring three-way positive electric control for spotting, lifting, and placing the load, it can travel loaded at speeds ranging up to 28 mph on-or-off road.

National Farm Co-Op Adding Space

The National Farm Machinery Co-Operative, Inc., Shelbyville, Ind., is adding 82,000 sq ft of manufacturing space to its plant and increasing employment from 250 to about 600 persons. The Co-Op has produced corn pickers since 1942, and now plans to manufacture a tractor cultivator, a new two-row corn picker, side-delivery rake, and a lister, according to J. F. Kerigan, general manager. The new plant addition is expected to be completed in November.

Dow Chemical Makes Truck Body Parts

Magnesium sheets and special shaped extrusions for lightweight truck bodies are now being made by the Dow Chemical Co. The extrusions are for nine ft, 12 ft, 14 ft, and 16 ft body sizes.

NEWS *of the* AUTOMOTIVE INDUSTRIES

To Road Test Centrax Gas Turbine Soon

Although the Centrax gas turbine exhibited at the British Industries Fair was unfinished, it has been announced by Mr. R. H. H. Barr, one of the engineers of Centrax Power Units, Ltd., England, that bench tests have been carried out with satisfactory results, and that road tests are expected in the near future. The 160-hp unit is suitable for trucks and buses, and it is admitted that smaller units are being built for passenger cars. Mr. Barr claims that while the thermal efficiency of the turbine engine is not equal to that of the piston-type engine at maximum power output, its efficiency stands higher at a normal road speed of 30 mph.

Harry Ferguson Arranges for $1.5 Million Financing

Harry Ferguson, Inc. has arranged for long-term financing through a 10-year, $1.5 million loan from the Penn Mutual Life Insurance Co. The money will be used to finance the construction and equipping of the new tractor plant which is nearing completion near the western outskirts of Detroit. The plant is expected to be completed by July 31, and production is scheduled to start a month later. The company is currently marketing Ferguson tractors imported from England, and reports sales in excess of $14 million for the first six months of this year.

Complete Uniform Military Procurement Methods

Virtually eliminating the former duplication of military buying programs, the new uniform procurement regulations for the military establishment and the Munitions Board have been completed. In general, they continue most of the joint buying practices established during wartime, including large scale contract negotiations. The Board has already set up coordinated buying methods in the major categories of military goods which comprise 83.9 per cent of the dollar value of Army, Navy and Air Force requirements. Three chapters of the regulations have been printed in loose leaf form and distributed to procurement officers. The remaining 11 chapters will have been distributed by Aug. 1. Under the new regulations, one system of military specifications will be used for all services; policies and procedures will be directed by the Munitions Board. Existing or new specifications will be used until superseded or revised under the new set-up.

Form Turbodyne Corp. for Independent Research

Now being organized as a completely independent engine development facility to be known as the Turbodyne Corp., the Northrop-Hendy Co. of Hawthorne, Calif., owned entirely by Northrop Aircraft, Inc., will be operated as an autonomous subsidiary, conducting its own development program independently. The company, which devoted many years of research to gas turbines, has developed a 10,000-hp gas turbine under an Air Force contract.

Aircooled Little Affected by Tucker Shutdown

The temporary shutdown of the Tucker Corp. plant at Chicago, due to the SEC investigation, will have little, if any, effect on its subsidiary. Aircooled Motors, Inc., Syracuse, N. Y., according to Carl F. B. Roth, president of Aircooled, who said that the plant is going ahead on its military aviation program as soon as operations are resumed July 26. The firm has several contracts for aircraft engines for both the Army and Navy.

Ford of Canada to Present New Meteor Automobile

The Meteor, replacing the old Mercury 114, will be introduced shortly by the Ford Motor Co. of Canada, Ltd. To be sold through the company's Lincoln-Mercury division dealers, the new car will have a Ford body and chassis, but will differ in some features of the body trim and in the grille.

Body Engineers Convention In Detroit, Nov. 3-5

Covering new trends in styling, production engineering, small cars, seating comfort, truck bodies, buses and coaches, materials in body construction, and passenger car body engineering, the annual convention of the American Society of Body Engineers, Inc. will be held Nov. 3-5, 1948 in Detroit.

'49 Ford Tooling Cost $72 Million

About $72 million was spent in the tooling, manufacture and purchase of new machines and the rebuilding and redesigning of others to build the 1949 Ford according to D. S. Harder, vice-president and director of manufacturing. It cost about $35 million to purchase, install, tool and try out other machinery, and to replace or renew parts on existing machines for the production of the 1949 Ford. Roughly $37 million was spent designing, fabricating and trying out special machines, tools, dies, fixtures and jigs at Ford plants.

K-F Organizes Canadian Affiliate

The formation of Kaiser-Frazer of Canada, Ltd., a new K-F Canadian affiliate, and the opening of executive offices and parts warehouse facilities in Windsor, Ont. have been announced by Kaiser-Frazer Corp. J. W. Atkinson has been named general manager.

PULLMAN DE LUXE

Built by the Rootes Group, the new Humber Pullman Limousine has a longer and wider body, with a wheelbase increase of 3.5 in. and a front tread hike of two in. It is powered by the Humber six cyl engine which develops 100 hp.

NEWS *of the* AUTOMOTIVE INDUSTRIES

FLYING FREIGHT TRAINS

To be the largest production transport used by the U. S. Air Force to date, the Douglas C-124 cargo aircraft has a designed gross weight of 175,000 lb. A built-in nose ramp permits loading and unloading heavy vehicles through "clamshell" doors. The plane has a wing span of 173 ft, 3 in.; length, 127 ft, 2 in.; and overall height 48 ft. 3 in.

USAF Lists 2201 Planes to be Procured

Permitting the awarding of contracts to aircraft manufacturers for 243 bombers, 1405 fighters and 553 transport, training and air-sea rescue aircraft, the $1,345,165,000 approved by the Secretary of Defense, for the procurement of aircraft by the USAF is detailed as follows:

Manufacturer	Type	No. of Aircraft
Boeing	B- 50D	132
Boeing	B- 50C	30
North American	B- 45C	51
Northrop	B- 49	30
Republic	F- 84C	409
Lockheed	F- 80C	457
North American	F- 86A	333
North American	F- 86C	118
Curtiss	F- 87	58
Curtiss	F- 87A	30
Fairchild	C-119B	99
Douglas	C-124A	28
Grumman	SA- 16A	32
North American	T- 28	266
Lockheed	TF- 80	128

Continental Ups Shipments of Aircraft Engines

Continental Motors had its largest airplane engine production month in May since the same month a year ago with shipments exceeding the average for the preceding 11 months by 82 per cent, according to C. J. Reese, president. Shipments of automotive and industrial engines, which account for about 60 per cent of the company's total business, increased 46 per cent to 142,077 for the first seven months of the current fiscal year.

Highway Lighting Can Be As Effective as Daylight

In the opinion of the Committee on Street and Highway Lighting of the Illuminating Engineering Society, it is economically feasible to light highways at night so that the light will be just as effective as in the daytime. This statement was made by Preston S. Millar, president of the Electrical Testing Laboratories, Inc. and a member of the committee, in an article in the current issue of *Industrial Standardization*. The IES committee is in charge of the work on the standard Practice for Street and Highway Lighting, which has just been given the status of American Standard by the American Standards Association.

GM Booklet Shows Benefit of Service Field

In an effort to stimulate more young men to enter the automotive repair business, GM has published a booklet outlining the job opportunities in the automotive repair field. Entitled "Opportunities in the Automotive Business", it points out that a mechanic can work with his head as well as his hands, and that really good mechanics are always in demand even in the worst of times. The booklet also points out how basic training in automotive mechanics paves the way to specialization in various phases of automobile servicing and forms an excellent foundation for future positions as shop foremen, parts or service manager, jobber salesmen, factory service instructor, repair shop owner, or automobile salesman.

Ford Sells Propeller Repair to Commercial Aircraft

Commercial Aircraft, Inc., Willow Run, Mich. has bought the Ford Motor Co.'s aircraft propeller repair and overhaul department. Located in one of the Ford aircraft hangers at the Dearborn test track, the shop specialized in maintaining all types of governors and propellers for personal planes. W. A. Wilson, in charge of the Ford department since 1928, will join Commercial Aircraft as general manager of propeller overhaul.

Rubber Workers Take 11c Wage Boost

An 11 cent hourly wage increase is apparently to be the pattern in the rubber industry. Firestone Tire & Rubber Co. has concluded an agreement with the URW-CIO covering employes in seven states.

The U. S. Rubber Co. signed a contract, effective June 28, with the URW-CIO which provides for an 11c an hour wage increase plus three weeks vacation with pay for employees having 15 years of service.

1948 MOTOR VEHICLE FACTORY SALES FROM U. S. PLANTS*

	Passenger Cars	Trucks	Buses	Total 1948	Total 1947
January	305,081	99,200	1,370	405,651	347,696
February	274,847	107,054	1,090	382,991	373,360
March	349,998	140,606	1,409	492,013	421,180
April	308,071	128,963	1,048	438,082	423,399
May	225,461	111,789	1,281	338,531	382,640
Total—5 Months	1,463,458	587,612	6,198	2,057,268	1,948,275

1948 FACTORY SALES TO DOMESTIC AND FOREIGN MARKETS*

	Passenger Cars		Trucks		Buses	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
January	285,373	19,708	83,893	15,307	1,068	302
February	256,753	18,094	88,889	18,165	752	338
March	327,198	22,800	118,572	22,034	1,202	207
April	288,356	19,715	111,911	17,052	902	146
May	209,591	15,870	96,909	14,880	1,161	120
Total	1,367,271	96,187	500,174	87,438	5,085	1,113

* Automobile Manufacturers Association.

NEWS *of the* AUTOMOTIVE INDUSTRIES

Timken Opens 10 Million Gallon Reservoir

Consisting of a new two-acre, 10 million gal reservoir and a cooling tower, 25 ft high, 60 ft long, and 30 ft wide, a new $200,000 water conservation system is now in operation at the Timken Roller Bearing Co., Canton, O. to insure its plants the 7.2 million gal of water needed daily for operation.

Award '48 Guggenheim Medal to Leroy Grumman

Awarded for notable achievements in the advancement of aeronautics, the 1948 Daniel Guggenheim Medal has been given to Leroy R. Grumman of New York. A board of 21 members, consisting of the former recipients of the medal, and representatives of the American Society of Mechanical Engineers, the Society of Automotive Engineers, the Institute of the Aeronautical Sciences, and the United Engineering Trustees, selected Mr. Grumman.

General Clark Bans Return of Scrap from Germany

Hopes for relieving the current scrap shortage in this country by importing scrap from Germany have been dashed by General Mark Clark who has said that none of the war scrap in Germany shall be shipped to this country. It is reported that England has already shipped a large amount of scrap from its zone to Britain. Another report of interest to the automotive industries is that an additional 10 million tons of finished steel may be shipped abroad under the European aid program. NADA reports that about 26 per cent of all finished steel produced in the United States is going abroad.

JET POWER AND A ROCKET PUNCH

Now carrying eight 140-lb rockets, four under each wing, the offensive power of the USAF's Republic F-84 Thunderjet has been considerably increased. The high velocity aircraft rockets are in addition to six .50 caliber machine guns. The rockets have a maximum velocity of 1400 fps, and have been test-fired from an F-84 flying at speeds up to 500 mph.

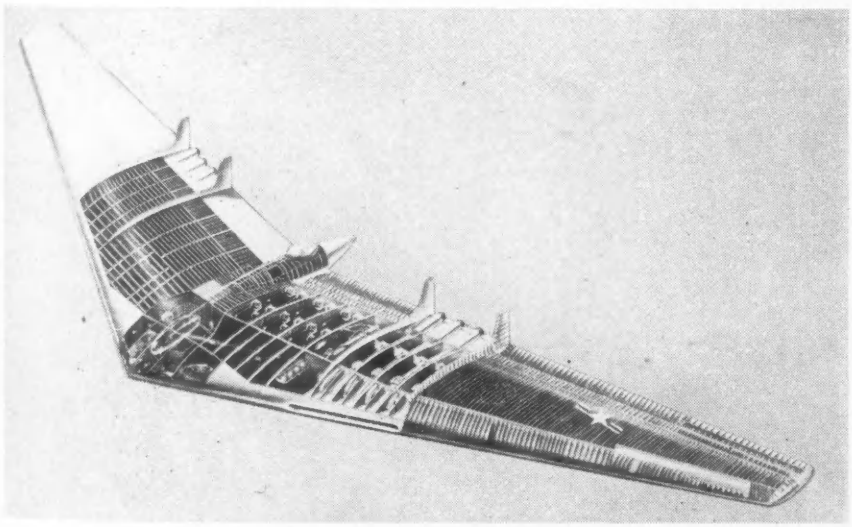
Timken-Detroit Axle Closing Waukegan, Ill. Plant

Timken-Detroit Axle Co. is closing its Waukegan, Ill. plant. The Wisconsin Axle Div. at Oshkosh, Wis. is being enlarged to accommodate machinery, inventory, and several hundred employes being moved from the Waukegan plant. Other parts of the Waukegan operation will be moved to Ashtabula, O., and Detroit.

IHC Expands Plants in Canada and U. S.

Expansion continues in the automotive news spotlight. International Harvester of Canada will shortly open a new truck assembly plant at Chatham, Ont. Costing $3 million with equipment, the new plant has 325,000 sq ft of floor space, and is located on a 50-acre site. It is expected that it will be able to produce 12,000 trucks annually.

In the United States, the International Harvester Co. is planning for operations at two different sites in Springfield, O., in addition to its Springfield Works. The Springfield Works export packing section, where International trucks are prepared for export shipment, will be transferred to a newly purchased building, and assembly of some engines and machining of some parts now carried on at Harvester's Indianapolis Works will be transferred to a company-owned building in Springfield.



TRANSPARENTLY APPARENT

The interior arrangement of the USAF's Northrop YB-49 Flying Wing is shown in this phantom drawing. Powered by eight G-E-designed, Allison-built TG-180 turbojet engines, the 100-ton flying dreadnaught, which is in the 500 mph class, can deliver a bomb load weighing over 30,000 lb.

McLouth Buys WAA Steel Plant in East Chicago, Ind.

The McLouth Steel Corp. of Detroit has purchased the war surplus steel-making facilities located in East Chicago for a sales price of approximately $1.2 million, slightly less than two-thirds the original cost.

(*Turn to page* 100, *please*)

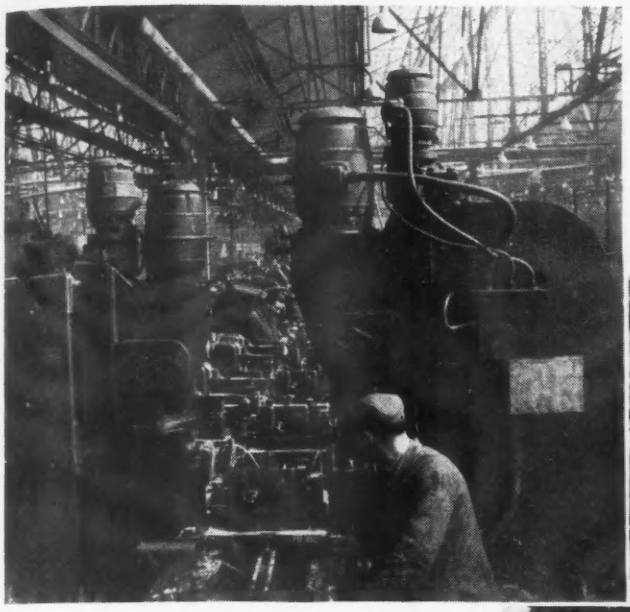
How Renault Has M
Its Plant to Triple O

SINCE its original layout in 1939, the design of the Renault has been worked on by production engineers to an extent that is not common in Europe. A special plant has been built, some of American and some of Renault design, to fit in with local and national conditions. It is rather difficult to say how much has been spent in tooling up, for the expenditure is tied in with repair after war bombing and the modernization of the factory to meet other production needs than that of the passenger car. In 1946 the French Government placed at the disposal of Renault a sum of $3,500,000 at the favorable rate of exchange of 120 francs (compared with the present rate of 305) and it is estimated that all of this has been expended on tooling up for the passenger car. Probably another million dollars can be added for American presses, electric spot welding machines and other plant equipment, which, while used on the passenger car production can also have other applications. This is part of the $7,000,000 expended for re-equipment since Renault was taken over by the French Government.

The ultimate Renault production program will be one passenger car model, three types of trucks, one coach model and one tractor model. The same engine will be used for the tractor and two of the trucks. The third truck will have the same Diesel engine as the coach.

The Renault car is a 1146 lb 83-in. wheelbase four-passenger automobile, with a tread of 47 in. and an overall length of 142 in. It has rear-engine rear-drive, with three-speed transmission and four independently sprung wheels with coil springs. Officially rated at four hp, the four-cylinder valve-in-head en-

One of five transfer machines installed for machining cylinder blocks.



(Left) Crankshaft transfer machine with vertically mounted No. 2 and No. 3 Renault heads shown in foreground.

(Below) This photo shows a number of Renault heads set up in several positions for a variety of operations on steering gear housings.

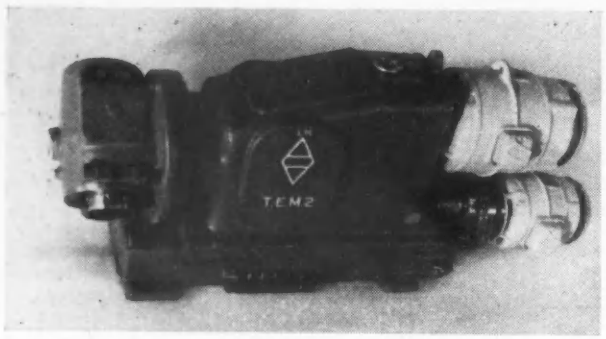
Modernized Output

By W. F. Bradley

Special European Correspondent
for AUTOMOTIVE INDUSTRIES

In retooling for the production of its four-passenger, rear-engined car, Renault has installed transfer machines and other latest types of American and French production equipment.

Transfer machine set up for intake manifold production.



One of the standard No. 2 Renault heads equipped with milling attachment.

gine of 46.3 cu in. (2.165 in. by 3.15 in. bore and stroke) develops 19 hp at 4000 rpm, with a compression ratio of 6.7 to 1. Crankshaft and camshaft are both cast. Aluminum alloy is used for the head, with iron valve seats. Centrifically cast cylinder barrels are used.

Pistons are aluminum alloy, as is also the transmission housing. Chassis and body are all-steel unit construction, electrically welded. The platform is of 0.037 in. sheet steel, with heavier cross members for the engine mounting, while the body is composed of steel pressings in 0.027 in. steel. The power plant has four-point rubber-block attachment to the platform and can be withdrawn as a unit together with the rear wheels for major repairs. At the present time a prewar passenger car model is going through the shops. The program calls for the progressive withdrawal of this model, leaving only the rear-engine model in passenger car production.

Tooling up has taken 18 months employing a staff of 55 designers and 15 draftsmen. The installation is now complete and in a few months the plant will be working to full capacity. It was decided to make direct purchases in the United States for specialized machine tools, and the following equipment was ordered: Red Ring rotary shaving machines for finishing gears cut on Fellows gear shapers; latest Gleason gear production machines; Colonial vertical broaching machines; Micromatic honing machines for finishing cylinder barrels; electric welding machines of various makes; new press equipment, including 14 Clearing presses.

Production plans included the use of automatic transfer machines to the greatest possible extent and 29 of these machines are now in operation, the most important parts produced by them being cylinder blocks, crankshafts, camshafts, intake and exhaust manifolds, differential housings, steering gear housings, oil pump housings, shock absorber housings, etc. Renault engineers standardized the components of the transfer machines and adapted them to the production of a great variety of parts. Thus, the same standardized components are used for cylinder blocks as for such small parts as oil pump housings. Hydraulic controls were ruled out because of the difficulty of obtaining oils of controlled viscosity. Low temperatures occur in shops because of insufficient heating in winter.

The basis of the installation is the adoption of three standardized motor units, which are capable of handling all of the work for this passenger car. These heads, designated TEM (Electro-mechanical heads) are as follows:

Type Head	HP of principal motor	Speed rpm	Travel in.	Weight lb
TEM 1	1.5	149 to 2030	7.9 & 11.8	297
TEM 2	5.0	59 to 740	11.8	700
TEM 3	15.0	58 to 778	15.8	1556

These units can be used with either single or multiple spindles and through gearing at 90 deg are adapted for milling, etc. They cover the requirements for all normal automobile units as well as truck and agricultural tractor parts. Fixtures are loaded by an operator at the beginning of the transfer machine, unloaded by another operator at the end and returned on a monorail. Each transfer machine therefore has two operators; in some cases the man who unloads one machine also loads the following machine. On some of the machines there is a neutral station, which is used for checking the work as it goes through, or for cleaning. Control is entirely electric. At the control (*Turn to page* 60, *please*)

This transfer machine produces 55 differential housing units per hour.

Argentina Makes Deal with Italian Car Maker

Reports from Both Countries Confirm Cisitalia Agreement; Details to be Announced Later, According to Special Dispatches from Turin and Buenos Aires to AUTOMOTIVE INDUSTRIES. Negotiations Now Being Conducted with Fiat and Isotta-Fraschini-Caproni Companies.

Turin

By Michael Chinigo

Argentine designs on South American supremacy in the field of automotive engineering and production are taking concrete shape in a series of agreements with Italian industrial groups. The Argentine blueprint, as seen from here, contemplates the transfer of Italian industries, complete in some cases and assembly plants in others, to Argentine soil as a first step for Argentina's self-sufficiency in automobile production and then to make Peron's Republic the automobile arsenal of the South American Continent.

An agreement with Italy's newest automobile company—the Cisitalia—has been already signed and agreements with two other industrial groups—the powerful Fiat of Turin and Isotta-Fraschini-Caproni of Milian are in the process of negotiation.

Negotiations with the Fiat Works are being conducted in Italy by Senors Domingo and Clemar Bucci and reportedly involve, initially, the transfer of Italian machinery and personnel to set up an assembly plant which would assemble automobile components manufactured in Turin. Later plans involve the creation of a "low-priced" automobile which would be produced directly in Argentina and exported throughout South America.

Negotiation between Argentine Government officials and Argentine interests on one side and the Caproni Works on the other are being conducted by Gianni Caproni himself who has been in Buenos Aires for sometime, with occasional jumps to the United States.

Officials of Cisitalia, the car which copped top prizes in this year's National "Thousand Mile" test, confirmed that the agreement had been completed and signed by Italian Engineer Dusio, executive of Cisitalia, and Argentine emmissary Dr. Gronda of the Silpa Enterprises. The accord, Cisitalia officials state, involves five billion lire, a sum which was put at the disposal of Cisitalia for the transfer to Argentina of its factory equipment for the construction "of a new type of automobile especially fitted for Argentine and South American consumption".

Technical and engineering details of this new automobile, which reportedly will be "a variation" of the present Cisitalia, are being kept secret, but it is generally acknowledged that it will have a bigger engine and roomier body than the Italian model, which, though definitely in the "luxury" class, has been designed in keeping with Italy's tortuous road network and limited availability of gasoline.

Buenos Aires

By David J. Wilson

Officials of the Secretariat of Industry and Commerce now state that an announcement would be made "opportunely" regarding the contract recently signed in Italy between an "emissary" of Argentine interests and the Cisitalia automobile factory of Turin, Italy.

Those officials, while refusing to reveal the scope of the contract, said that the deal was in hands of the "Direccion de Radicacion de Industrias" (Industrial Radication Bureau) which drafts plans to set up new industries in Argentina.

Adolfo Mario Savino, head of the Bureau, is reported to have been one of the Argentines who participated in the discussions with Cisitalia although there was no indication whether the contract involved merely assembling a small number of Cisitalia cars in Argentina, as reported in some quarters, or whether it concerned the construction of a full-fledged Cisitalia factory in this country.

The agreement signed in Turin is subject to confirmation by the National Economic Council, and until that organization issues a report, no official information will be released, according to government officials. (*Turn to page 76, please*)

Canada's Turbojet

OFFICIAL test running of the Canadian Chinook, a 2590-lb thrust turbojet engine which was designed and manufactured for the Royal Canadian Air Force, has been announced by A. V. Roe Canada Ltd. This new power plant was described briefly in the February 1 issue of AUTOMOTIVE INDUSTRIES, page 22.

Design Features

Major components of the Chinook are a nine-stage axial-flow compression, six combustion chambers, a single-stage axial-flow turbine and an exhaust tail cone.

The nine-stage axial flow compressor is preceded by precision cast aluminum-alloy inlet guide vanes, and discharges its air directly into the combustion chambers through six diffusers. The first two stages of rotor blades are stainless steel; the remainder aluminum alloy. The rotor is supported in a self-aligning anti-friction bearing at the front end, and a duplex-type ball bearing in a self-aligning mounting at the rear.

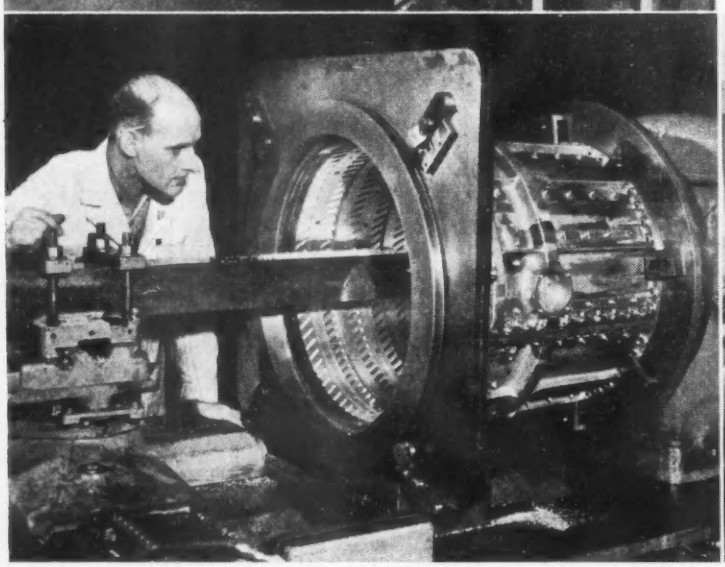
The six combustion chambers are interconnected and of the straight-through type, discharging into a fabricated nozzle box. Each chamber consists of an outer air casing and an inner flame tube.

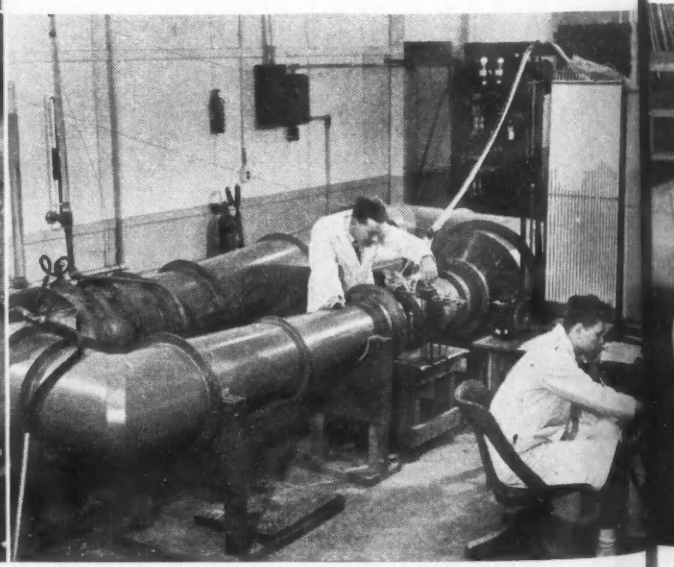
The turbine rotor comprises an alloy steel disc with an integrally forged stub shaft, and chrome-nickel alloy rotor blades fastened to the rim by dove tails. Cast chrome-cobalt nozzle guide vanes are used. The front end of the turbine shaft connects directly to the rear of the compressor rotor through a flexible coupling designed to compensate for angular misalignment.

(Lower left) The operator here is machining interior of compressor stator casing on Avro Chinook to match rotor blade tips. The two halves of the casing have been assembled for this operation.

(Upper Left) By means of this test rig, bearings are operated at high speed under simulated load conditions to study bearing life and lubrication problems.

(Below) Pictured here is the closed circuit wind tunnel for all types of aerodynamic studies connected with the flow of air and gases through the engine. The design of the tunnel is very flexible, allowing different configuration of ducting. Air is supplied by a two-stage axial-flow fan.





Test Facilities

The tail cone is fabricated from stainless steel sheet with cast flanges at front and rear, and is insulated by glass wool encased in silver foil shields under a sheet aluminum outer covering.

The fuel system comprises two Lucas variable-delivery positive-displacement pumps, one flow-control unit, a pressure-regulating valve, six burners, a combined solenoid and torch-igniter reducing valve, and two torch igniters.

A dry-sump lubrication system is used which incorporates a multiple type pump consisting of one pressure and two scavenge elements. The two scavenge pumps draw oil from the front and rear main bearings, with the center bearing drained by gravity both fore and aft. An oil tank, oil filter and pressure regulator complete the system. A direct drive electric motor is used for starting the engine from a 24 volt d-c supply.

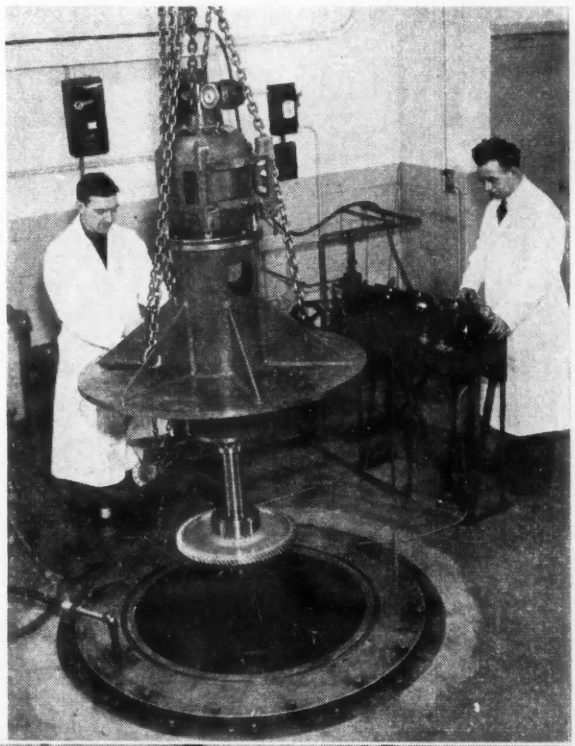
Major Specifications of Chinook Turbojet Engine

Maximum Thrust (Static take-off)	2590 lb at 10,100 rpm
Diameter of Engine	32 in. (basic)
Length	125 in. (overall)
Frontal Area	5.59 sq ft
Weight	1250 lb
Fuel	Aviation Kerosene

Manufacture and Test Facilities

The facilities for the manufacture of gas turbine components at Avro Canada, located at Malton, Ontario, while quite extensive, are set up primarily as an experimental factory. Huge production lines are not required at present, but rather a flexible

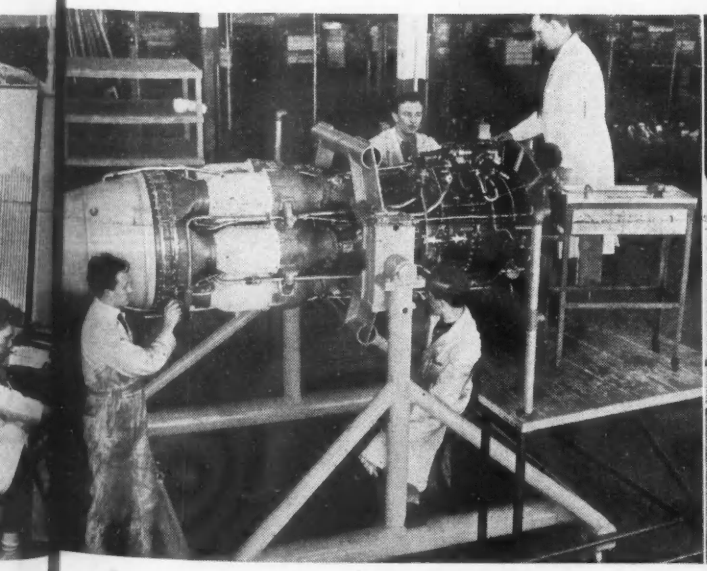
(*Turn to page* 64, *please*)

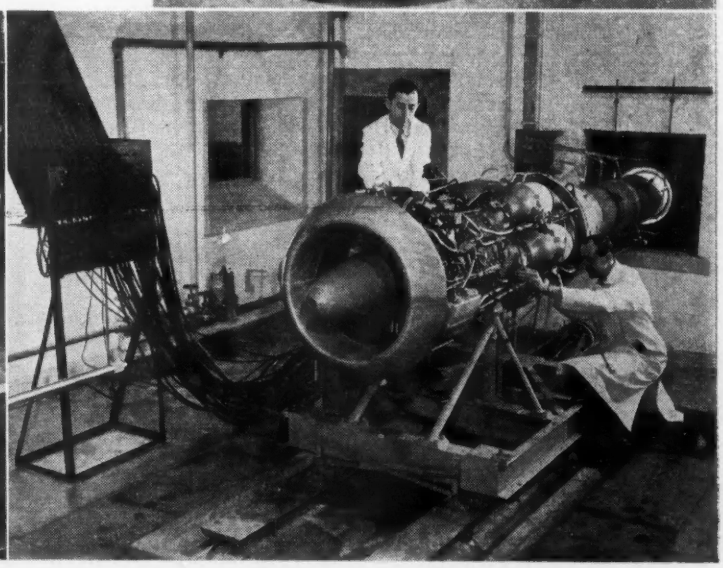


(Lower Right) Chinook engine on test bed. Final adjustments are being made prior to test running. One of the observation windows leading from the control room can be seen on the left.

(Below) Avro Chinook jet engine on its final assembly stand; fuel and oil lines are being pressure tested. Engine on final assembly stand can be swung through 90 deg. It is normally assembled in the vertical position.

(Upper Right) Overspeed test rig in mechanical components laboratory. This is used for testing the behaviour of rotating parts of the engine under high speed. Compressor and turbine disks are spun in a partial vacuum to cut down windage losses and reduce power requirements. In this photo the compressor disk is being lowered into the steel-lined pit.





Improved Steering and Braking with Increased Power are Among the Features of these New Diamond T Series

IN ONE of its first postwar announcements the Diamond T Motor Car Co., Chicago, Ill., has introduced two 1948 Series—Model 614 with companion models 614H and 614SBD1055; and Model 704 and 704H. Model 614 with a nominal rating of 2½ to 5 tons is a heavy-duty job while the 704 with nominal rating of 3 to 6 tons is in the extra-heavy-duty class. On the 614, maximum GVW rating is 21,200 to 28,000 lb, while maximum gross train rating is 40,000 lb.

The 1948 second series Model 614 replaces the former 614—which is discontinued—and offers a number of major features of interest. Among these are: the F550 Clark front axles which has a greater capacity and a wider track; the Ross Model TA26 roller-bearing cam and twin-lever steering gear with a 20-in. wheel; new 9½-in. stroke Bendix Hydrovac booster, giving up to 50 per cent increase in brake line pressures; an increase of 1000 lb in the maximum GVW rating of both models; new front end sheet metal; and a new tire option—maximum size of 10.00-20-12-ply all around with dual in the rear. (Former maximum was limited to 9.00-20 at the front).

The changes made in these models are said to result in a better balanced unit with uniform tire sizes front and rear. Perhaps the biggest advance is found in greatly improved steering and steering ease, and a much smaller turning circle. For example, on the 614 with 10-in. tires in front the turning circle is 10-ft. less with a wheelbase of 163-¾ in. than on the distinued model with 9-in. tires and wheelbase of 151-¾ in.

Due to these improvements and options the price of the 1948 Model 614's has been increased somewhat over the prices for the discontinued model.

Models 704 and 704H represent the culmination of more than two years of experimental work, and feature adoption of the Hercules TDXB gasoline engine having a rating of 162 hp, compared with 139 or 143 hp on previous models. Other features and options will be described later.

Maximum GVW for the Model 704 is 25,000 lb; for 704H—28,000 to 30,000 lb. Maximum gross train ratings as a tractor range from 45,000 to 55,000 lb, while maximum GVW ratings for six-wheelers range from 35,000 to 38,000 lb.

The Hercules TDXB engine is a new model for Diamond T and boasts some interesting features such as a larger block with ample cooling capacity, a water pump with a capacity of 146 gpm, a 3-in. counterbalanced crankshaft and a new type built-in oil cooler

Wheelbase and Chassis Dimensions

Wheelbase	CA	Cab to End Frame	Body Length
139¾ in.	60 in.	108 in.	8-9 ft
151¾ in.	72 in.	126 in.	10-11 ft
**163¾ in.	84 in.	144 in.	12 ft
**175¾ in.	96 in.	168 in.	13-14 ft

Wheelbase	CA	Cab to End Frame	Body Length
*187¾ in.	108 in.	189½ in.	15-16 ft
189 in.	109¼ in.	189½ in.	15-16 ft
*199¾ in.	120 in.	201½ in.	17-18 ft
201 in.	121¼ in.	201½ in.	17-18 ft

** These wheelbases in both conventional and six-wheel models.
* These wheelbases six-wheel model only—other wheelbases four-wheel models.

NOTE: Standard wheelbases for 614 and 614H are 139¾ and 151¾ in.
Standard wheelbase for 614SBD1055 is 163¾ in.

Models 704, 704H and Six-Wheelers

Models 704, 704H and Six-Wheelers

Standard Models

Wheelbase	CA	End Frame Cab to	Length Body
130¾ in.	60 in.	108 in.	Tractor
142¾ in.	72 in.	120 in.	Tractor
154¾ in.	84 in.	144 in.	12 ft
172¾ in.	102 in.	168 in.	14-15 ft
190¾ in.	120 in.	192 in.	16-17 ft
208¾ in.	138 in.	216 in.	19-20 ft

Six-Wheelers

168¾ in.	98 in.	168 in.	14 ft
186¾ in.	116 in.	192 in.	16-18 ft
204¾ in.	134 in.	240 in.	20 ft
222¾ in.	152 in.	264 in.	22 ft

NOTE: Standard wheelbases for conventional models are 130¾, 142¾ in, and 154¾; 168¾ for six-wheelers.
Other wheelbases listed are optional at extra cost.

The Model 704 is powered by a Hercules TDXB gasoline engine with a rating of 162 hp at 2600 rpm. This engine is a new model for Diamond T.

Here is the 1948 second series Model 614 Diamond T which replaces the former 614 and offers a number of improvements.

Diamond T Introduces

New Trucks in Two Series

with oil manifold enclosed in the block. The engine is equipped with a 12-volt electrical system with an oversize 55-amp belt-driven generator mounted high above the block. A feature contributing to exceptional engine smoothness and quietness is the adoption of the Houde viscous torsional vibration damper carrying a charge of Silicone fluid, recently announced by Houde.

Exhaust valves are hard faced and are arranged to rotate while the engine is running. Valve guides are counterbored. A mechanical governor is standard. The air intake on this engine as well as on the JXLD installation is a special feature, an oil bath air cleaner being mounted outside the hood to take advantage of the cooler outside air.

Other 704 features include: a built-in mechanical tachometer as standard equipment, automatic radiator shutters as standard equipment and a Lipe 14ML, 14-in. clutch of increased capacity. In addition, the Clark 276V, five-speed transmission is used instead of the 270V when overdrive is not specified.

It is of interest to find that, in other respects, the Model 704 is identical with Models 702A and 703 (which are continued in the line) while the 704H carries axle specifications corresponding with Models 806A and 809. From the standpoint of price, the Model 704 series will be somewhat higher than the earlier models.

Coming to the general specifications of the Model 614, it may be noted that for higher speeds and better performance on grades, Diamond T recommends the Hercules JXLD engine on Model 614H and 614BD1055. The brake system features internal-expanding hydraulic brakes on all whels with Bendix Hydrovac booster. Brake drums are of fine-grained, alloy cast iron. The brakes require no lubrication and are automatically equalized for wear. Front brakes are 16¼ by 2½ in. with 5/16-in. molded linings; rear brakes are 16½ by 4 in. with ⅜ in linings.

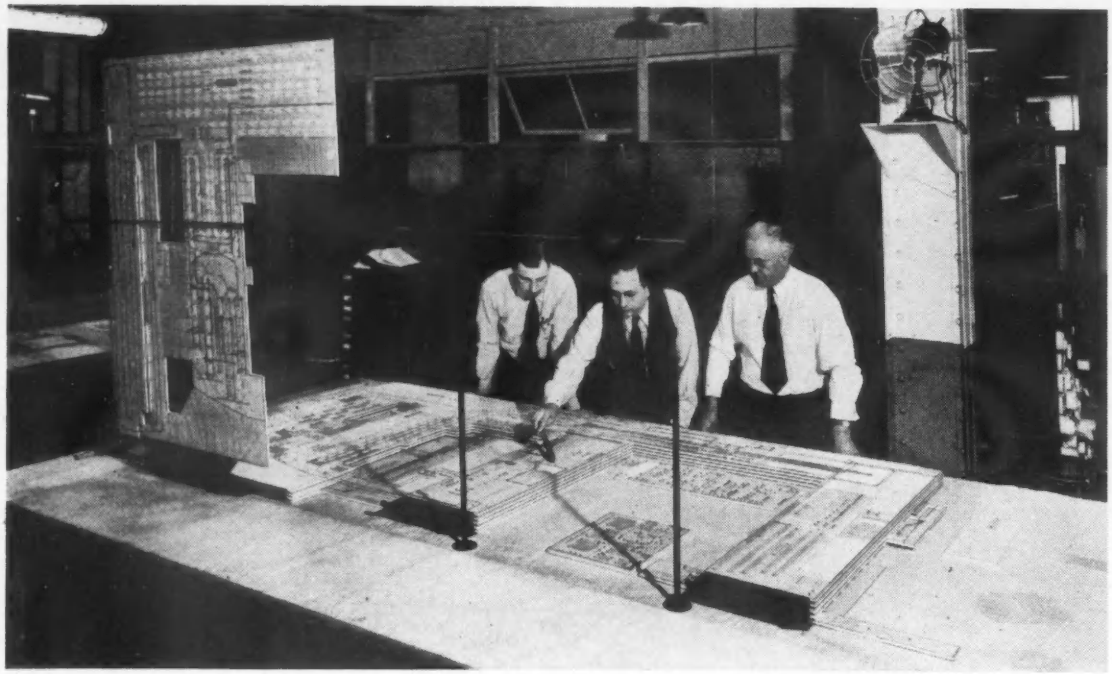
Brakes for Models 614H (*Turn to page 72, please*)

Condensed Engine Specifications

Diamond T—Hercules Engines

	Model 614	Model 614H 614SBD1055	704, 704H Six-Wheelers
Engine	JXO	JXLD**	TDXB
No. Cylinders	6	6	6
Bore (in.)	4	4	4⅜
Stroke (in.)	4¼	4½	5¼
Displacement (cu in.)	320	339	474
Brake Hp (max.)	113 @ 3000 rpm	130 @ 3000 rpm	162 @ 2600 rpm
Torque (max.) (lb ft)	230 @ 1200 rpm	272 @ 1400 rpm	365 @ 1400 rpm
Main Bearings	7	7	7
Compression Ratio	6.50	6.90	6.50
Clutch Size (in.)	12	12	14

* Horsepower and torque as "bare" engine rating.
** Optional but recommended and usually specified.



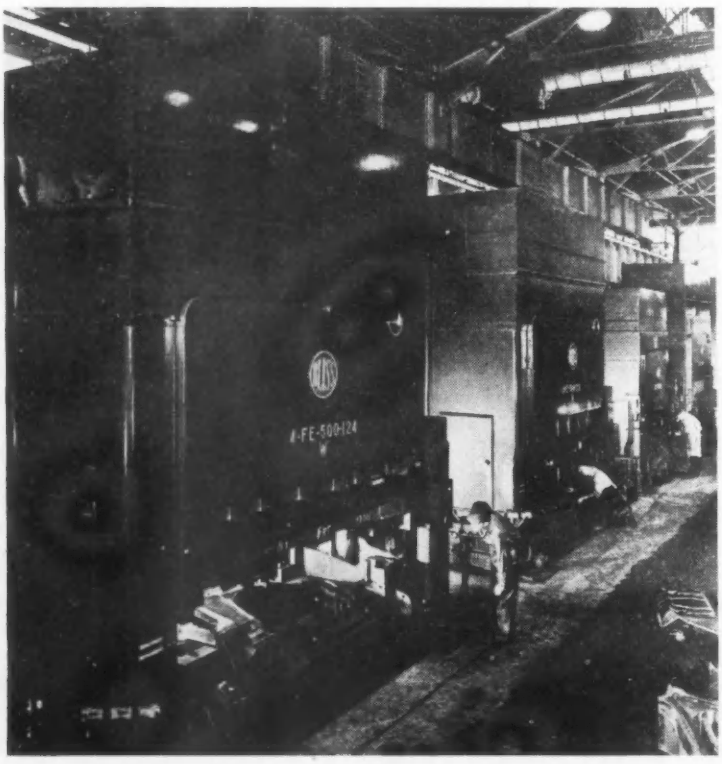
Initial planning of plant rearrangement has been facilitated with this unique scale model. As shown here it consists of a separate floor plan for each of the five floors, each of the sections being securely hinged to the metal frame in the foreground. Recesses such as may be seen in the section at the left represent open bays extending two or more floors.

Nash Prepares for 1949

IN the process of rearrangement in advance of the changeover for 1949 models, the Milwaukee body plant of Nash Motors Division has installed 31 new presses including an array of immense presses now being prepared for operation. It is noteworthy that plant engineering already has completed the floor plan to take care of the changes in layout and relocation of departments to expedite the flow of 1949 bodies in production at the proper time. Meanwhile, the detail changes are being made bit by bit without interfering with current manufacturing.

When the changeover is completed later this year, the body plant will have miles of new monorail conveyor systems linking the sequence of operations in various departments, serving to transport stampings and parts from one point to another and at times from one floor to another, or spanning several floors in some cases. This has posed a considerable problem of visualization considering that the plant consists of 26 sections in five-story buildings with a total floor space exceeding 1,200,000 sq ft.

In addition to the 31 new presses, a large number of Federal and Expert "Ultra-Speed" multi-spot welding presses for the automatic spot welding of numerous parts such as doors and dash and pillar assemblies will be installed. One of the first of the new Federal welding presses—now in operation and illustrated here—handles the



Perspective view of the five new Bliss presses in the line-up of seven presses described in the text, representing the rear quarter stamping line.

Close-up of the first unit of the battery of Federal "Ultra-Speed" welding presses to be installed here. This one, tooled for welding dash assemblies produces 76 spots at a time.

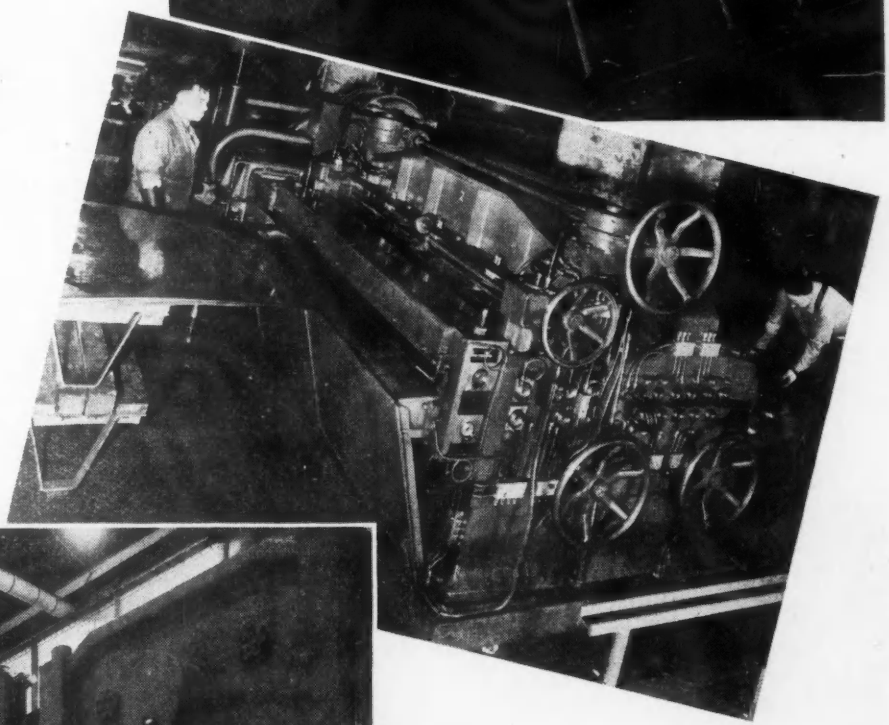
welding of attachments and braces to the dash assembly. It produces 76 spots in a single setting. An interesting feature of this machine is the mounting of the inclinable fixture on a rolling dolly to facilitate the loading and unloading of large assemblies outside of the welding head. That Nash has had considerable production experience with this type of equipment is evidenced by the fact that they have had two Expert multi-spot welders in use since 1938 for welding rear window frames to the roof panel. Each of these units produces 50 spots at a time.

The use of large merry-go-round conveyor lines for the assembly of roof panels, body sides, an dmain (*Turn to page* 90, *please*)

Production

By

Joseph Geschelin



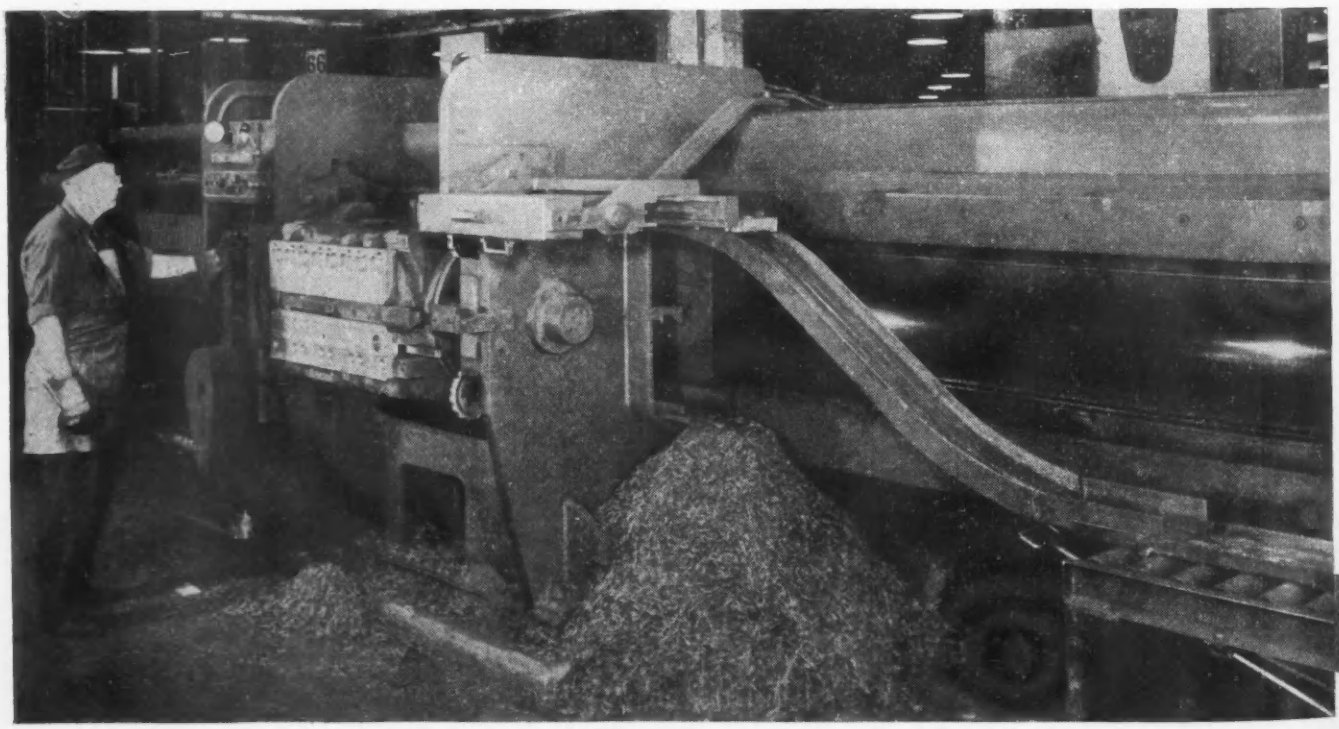
(Above) Latest type Budd-McKay roller leveler press installed in the press shop will handle sheets 90 in. wide.

(Left) This is the battery of four Clearing presses constituting the new door clinching line.

Upon completion of broaching in the Cincinnati Hydro-Broach, cylinder heads are fed into this nine-station Footburt transfer machine for completion of all drilling, tapping, chamfering and reaming operations.

Flexible Transfer

Here is the enormous Cincinnati horizontal Hydro-Broach for machining the top and bottom surfaces of cylinder heads. The full stroke of the ram is 14 ft-7 in., with a cutting speed of 37.5 fpm and return speed of 67 fpm. The size of the cutting broaches may be visualized from the section which may be seen at the extreme left. The fixture has two stations, each one holding two heads. In the cutting position, the lower ram finishes the gasket face, the upper ram taking the three ribs on the top surface. Finished heads are ejected into the chute at the right and fed directly to the adjacent transfer machine. The partly finished head at the top is ejected into the shuttle which may be seen at the center, turned into position for loading into the fixture for the second pass.



Machines

Packard Cylinder Heads and Blocks Handled at High Rates on Specialized Equipment

FOR MACHINING cylinder heads and blocks of its eight-cylinder engines, Packard Motor Car Co. has in operation an integration of transfer machines of advanced type. In the main, the equipment consists of large individual transfer machines of station type—supplied principally by Ingersoll and Foote-Burt. The cycle within each machine is completely automatic from the moment work is fed into the loading station. The entire line of machines from one operation to another—in the case of cylinder blocks—is linked by a gravity roller conveyor system, with roll-over fixtures at certain points to facilitate turning of the block for an individual machine.

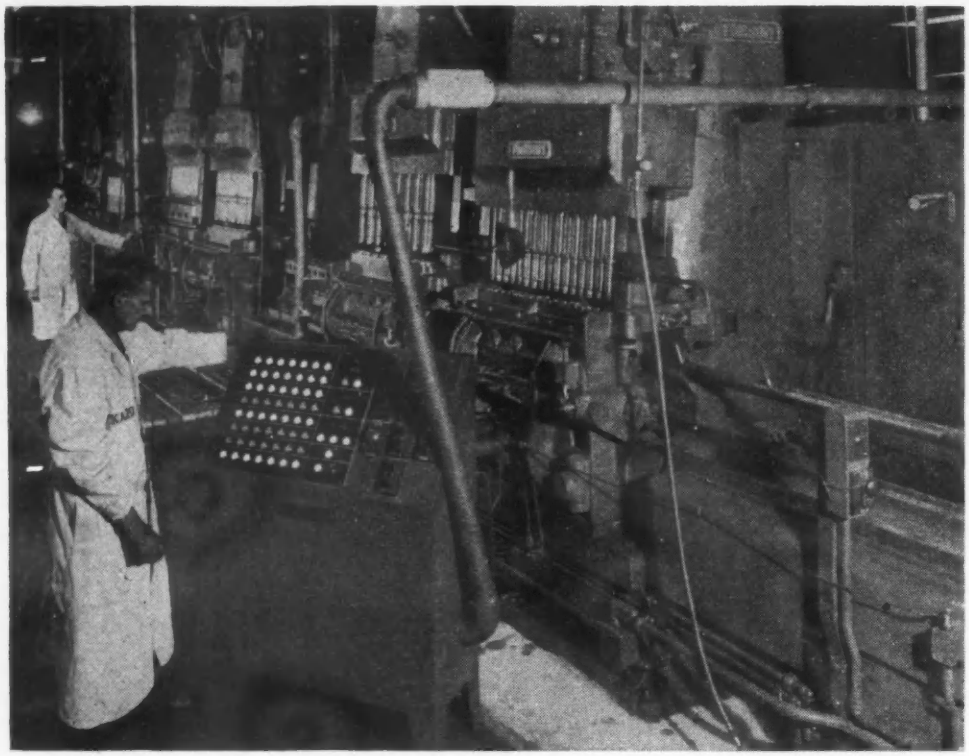
Despite the adoption of transfer machines, Packard has insisted upon machine design of flexible character so as to permit of product change, thus freeing both plant management and engineering of the serious problem of a frozen product design owing to expensive but inflexible machinery. For example, they are particularly proud of the Footburt transfer unit which automatically handles the sequence of operations required for the drilling and reaming of tappet bores and countersinking and facing valve seats. In conventional practice this requires considerable equipment and manpower; with the transfer machine the entire cycle is fully automatic and requires an operator only for loading, and for unloading at the exit end.

These expensive and massive column-type machines, nevertheless, are quite flexible. In the event of a product change, the basic parts of the machines can be continued without change. A major change would require only new spindle heads—which are readily removable and replaceable. This is an important aspect of plant management considering the enormous investment involved in transfer line practice.

The massive Cincinnati horizontal Hydro-Broach equipment plays a major role in the motor department. The two big Cincinnati machines on the cylinder block line are the same ones used by Packard for some years, suitably rebuilt and re-tooled. The enormous Hydro-Broach for machining the top and bottom faces of cylinder heads is new. It was installed with the introduction of the 1948 engines.

Cemented-carbide tools of suitable grades are em-

The 17-station, Footburt two-way horizontal drilling machine of transfer type for the drilling and tapping of holes in the end of cylinder blocks, the work being fed through in side-wise position as shown. It is of interest to note that the first 11 stations are employed primarily for step-by-step drilling of the oil gallery holes.



This is the Footburt transfer machine for handling the operations on the valve line—intake and exhaust valve throats, valve face clearance, valve guide and tappet holes—in a single pass. It consists of seven multiple-spindle drilling units tied together to form a 12-station transfer line. The view here is taken at the first station.

ployed to the fullest extent. They are found on milling cutters and are used in the end-mills for facing valve seats on the Footburt machines. In addition, a cemented-carbide blade is used in the cylinder head broaching tool as a finishing section for the bottom face of the head.

Adoption of a transfer line for cylinder heads has simplified machining operations to a remarkable degree, has virtually eliminated materials handling, and has compacted the useful working area to a small compass. In effect, the head is finished in just two machines—the Cincinnati horizontal Hydro-Broach; and the Footburt horizontal head transfer line.

The big broaching machine takes castings in the rough, roughing and finishing the top and bottom faces automatically. The work-holding fixture is of drum or trunnion type and has two stations—one for loading, the other for broaching, each station holding two heads. The top position in the fixture is for broaching the three long ribs on the upper face; while the lower position holds the head for finishing the bottom surface. In this fashion one completely finished head is produced for each stroke of the ram. As illustrated, the huge ram carries two sets of broaching tools, one for the top, the other for the bottom face.

Loading and unloading has been mechanized to make the operation as nearly automatic as is practical. For example, the only function of the operator is to slide the work into the loading station, the other functions being automatic. At the end of the ram stroke, the completely finished head in the lower section of the fixture is ejected into a chute which feeds downward directly to the loading station of the Footburt transfer machine. The head in the upper section of the fixture, being broached only on the top surface, is ejected simultaneously into a trunnion type shuttle fixture mounted on the bed of the broach. The operator simply rotates the device to present the bottom face, and slides the head directly into the work-holding fixture for the final cut.

Some figures on the broaching machine will be of interest. The full stroke of the ram is 14 ft - 7 in. Cutting is done at a ram speed of 37.5 fpm, return is 67 fpm. Depth of cut is a full $\frac{1}{8}$ in. on the bottom face, 1/16 in. on the upper face ribs. Some impression of the amount of metal removal and the physical size of the broaching tools may be gained from the size of the head—$7\frac{7}{8}$ in. wide by $34\frac{3}{8}$ in. long.

The Footburt transfer unit for the cylinder head is a massive integrated machine composed of two, two-way horizontal drilling machines; one combination vertical head and horizontal head; one vertical drilling head; and a combination vertical and horizontal tapping machine. The tapping machine is being operated with Cimcool cutting fluid supplied by Cincinnati Milling Machine Co. and is said to do an excellent job of tapping. From the standpoint of processing this machine is considered a nine-station unit, with Station 1 for loading, Station 9 unloading, while Stations 4 and 7 are idle.

Unique Signal Panel

The outstanding feature of this machine is its complete automaticity, the cycle going through its paces under external control with clamping and unclamping of work and movement from one station to another effected without the supervision of operators. Its unique characteristic is the compact signal panel which has a light for each function of the machine, thus signalling the operator as to the sequence of events and their completion. If any individual function, subject to automatic control, fails the machine will stop and the operator can see quickly just where the trouble may be.

The following is a brief resume of operations at each station:

(*Turn to page* 78, *please*)

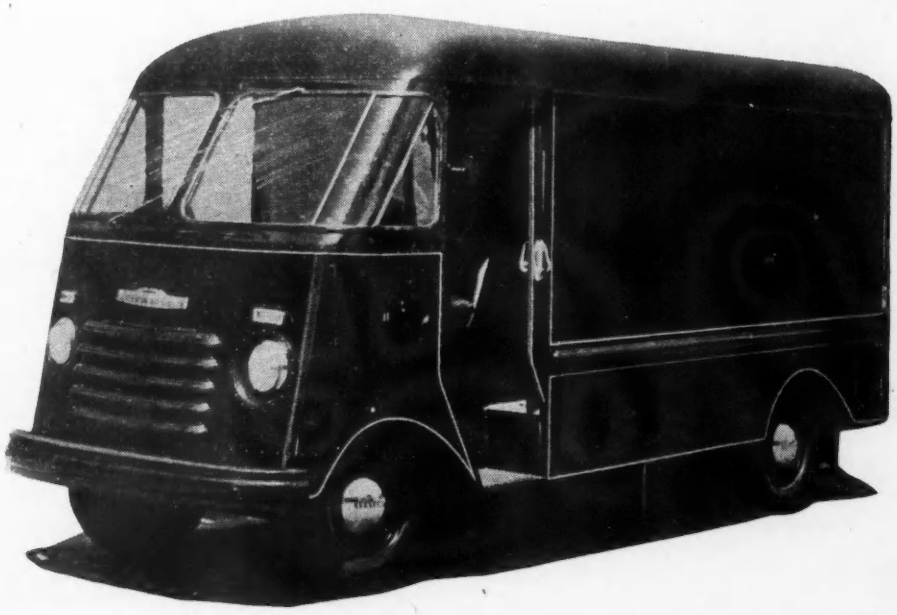
New Chevrolet DubiDuty forward-control chassis.

Chevrolet Introduces Two Forward-Control Truck Chassis

DESIGNED particularly for truck service that involves frequent stops or house-to-house delivery, Chevrolet announces the addition of two new chassis to its line of Advance-Design trucks for 1948. The new chassis, which are of the forward-control type, are designed to permit the mounting of bodies of greater cubic content with no increase in over-all vehicle length.

To provide for added body space, the new chassis are designed with the steering gear mounted ahead of the front axle and outside the frame side-member. Wider and heavier front axles and heavier front springs are provided to accommodate the added load on the front end of the vehicle. The turning diameter of the truck has been reduced for greater operating convenience in city delivery.

The new chassis are built in two wheelbase lengths to accommodate bodies up to 11 ft of load space length. The Model 3742, with a wheelbase of 125¼ in. has GVW rating of 6200 lb with standard 15 in. 6-ply tires. Maximum tire equipment 7.00-17, 8-ply, is available as an option and increases the GVW rating to 7000 lb. This chassis is designed to accommodate bodies with loading space up to 10 ft in length and 350 cu ft capacity. A new three-speed Syncro-Mesh transmission with steering column gearshift is standard equipment. The Chevrolet four-speed Syncro-Mesh transmission with conventional gearshift is available as an option for (*Turn to page* 84, *please*)



Panel delivery truck with Chevrolet forward-control chassis.

Crosley's Method of

IN announcing the adoption of bonded brake linings as standard equipment Crosley Motors Inc. earned the distinction of being the first passenger car manufacturer to place this practice in regular production. Although the pros and cons of bonded brake linings have been under discussion for several years and leading manufacturers have been experimenting with them for some time, up to this writing only the Dodge truck division has publicly announced the use of bonded brake linings and then only on certain models.

The Crosley brake assembly is a simple mechanism consisting essentially of two metal shoes anchored at the bottom and expanded at the top by a cam which can be spread by wedges to accommodate for lining wear. The rib and web of the brake shoe are steel stampings projection-welded together in five steps on a special welding machine made by the Precision Welding Machine Co., of Cincinnati. The shoe assembly is then cadmium plated for protection, the plated coating being later removed by rough grinding from the face of the web to which the lining is bonded. This is an important and basic operation since the surface for bonding must be clean and free from even traces of plating to assure perfection of bonding.

For bonding Crosley uses the Permafuse technique. In essence, the inner surface of the brake lining is first wetted with Permafuse cement so as to provide a good contacting surface for gluing the Permafuse bonding tape to the lining. This procedure assures that the tape will not become separated from the lining in subsequent operation.

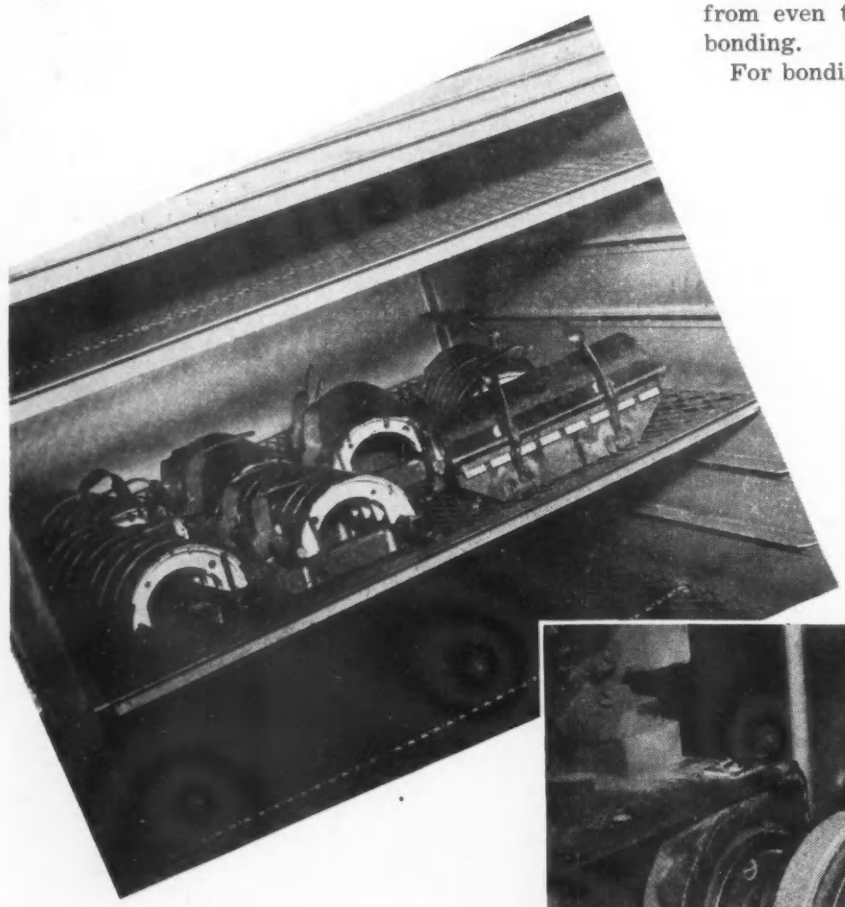


Fig. 1 (Above) Brake lining and Permafuse bonding adhesive are assembled to brake shoes and placed in the clamping fixtures shown here. The load is baked in this oven for 30 minutes at 400 F to provide a firm and strong bond between lining and shoe.

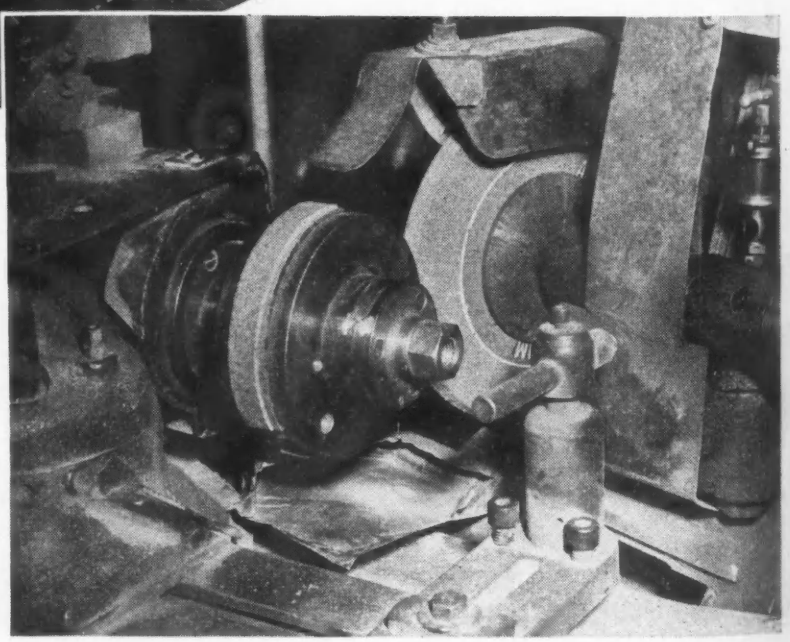


Fig. 2 (Below) After bonding the shoes are chucked in pairs in this grinder and ground concentrically with the axis within plus or minus 0.005 in.

Bonding Brake Linings

The lining is then placed on the brake shoe and a group of 12 shoes is assembled in special clamping fixtures. The fixtures are clamped securely and loaded into a baking oven on shelves as shown in Fig. 1. The load is baked for 30 minutes at 400 F to secure a permanent bond between the lining and shoe.

Following baking the shoes are mounted in pairs, in a special chuck, on the grinder shown in Fig. 2. The diameter of the lining surface is held concentric with the axis within a tolerance of plus or minus 0.005 in. The brake shoes then are ready for final assembly.

Fig. 3 shows the sheet metal brake shoe—prior to the bonding of the lining—mounted in a Besly surface grinder to grind the cam contact surface. This is done before hardening to produce a surface dimensionally true within plus or minus 0.005 in. The cam contact surface then is flame hardened to 350-400 Brinell in the machine shown in Fig. 4. The table of this machine is arranged to automatically index from the heating station in the background to the quenching station at the left and to automatically eject the parts in the foreground as shown.

According to the engineering department the technique of bonding linings is adopted primarily to eliminate rivet head interference with the brake drum. This process is said to have effected materially increased useful life of the linings. Permafuse bonded linings have been tested for over a year without finding a single case of a bonding failure, according to the company.

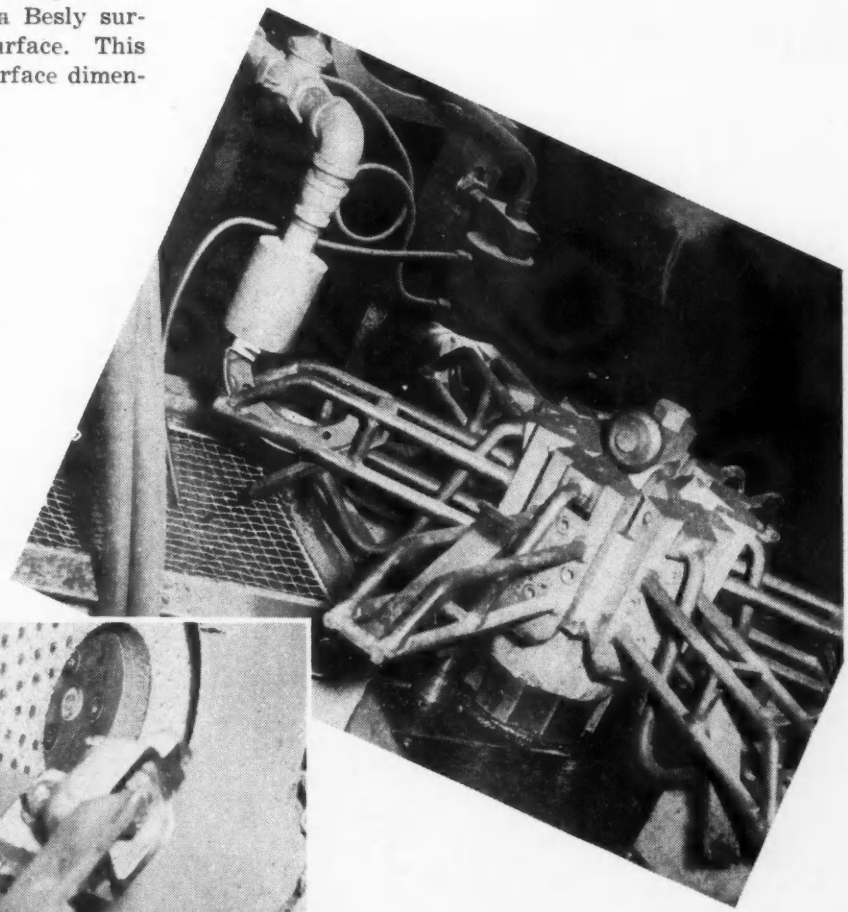


Fig. 3 (Below) Prior to bonding of the lining the brake shoe is ground at the cam contact surface in this Besly surface grinder to provide a surface true within plus or minus 0.005 in.

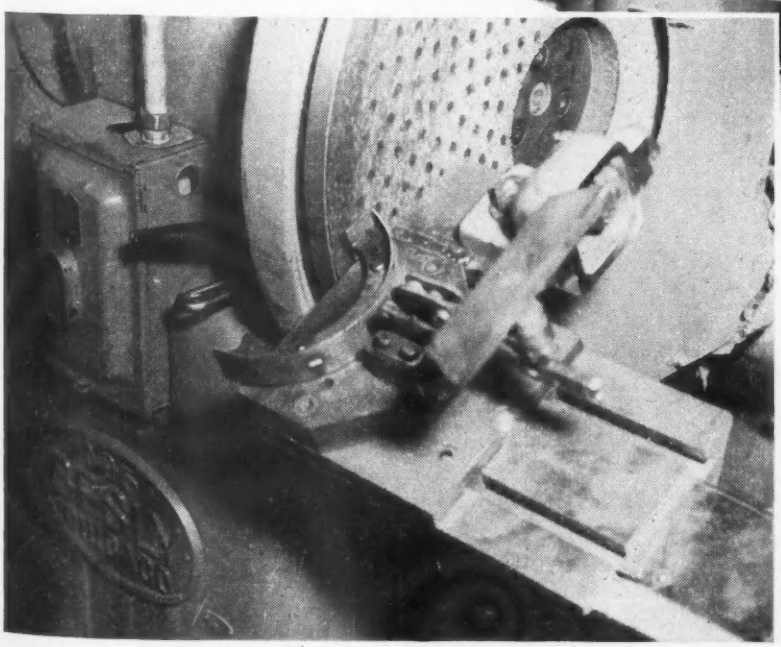
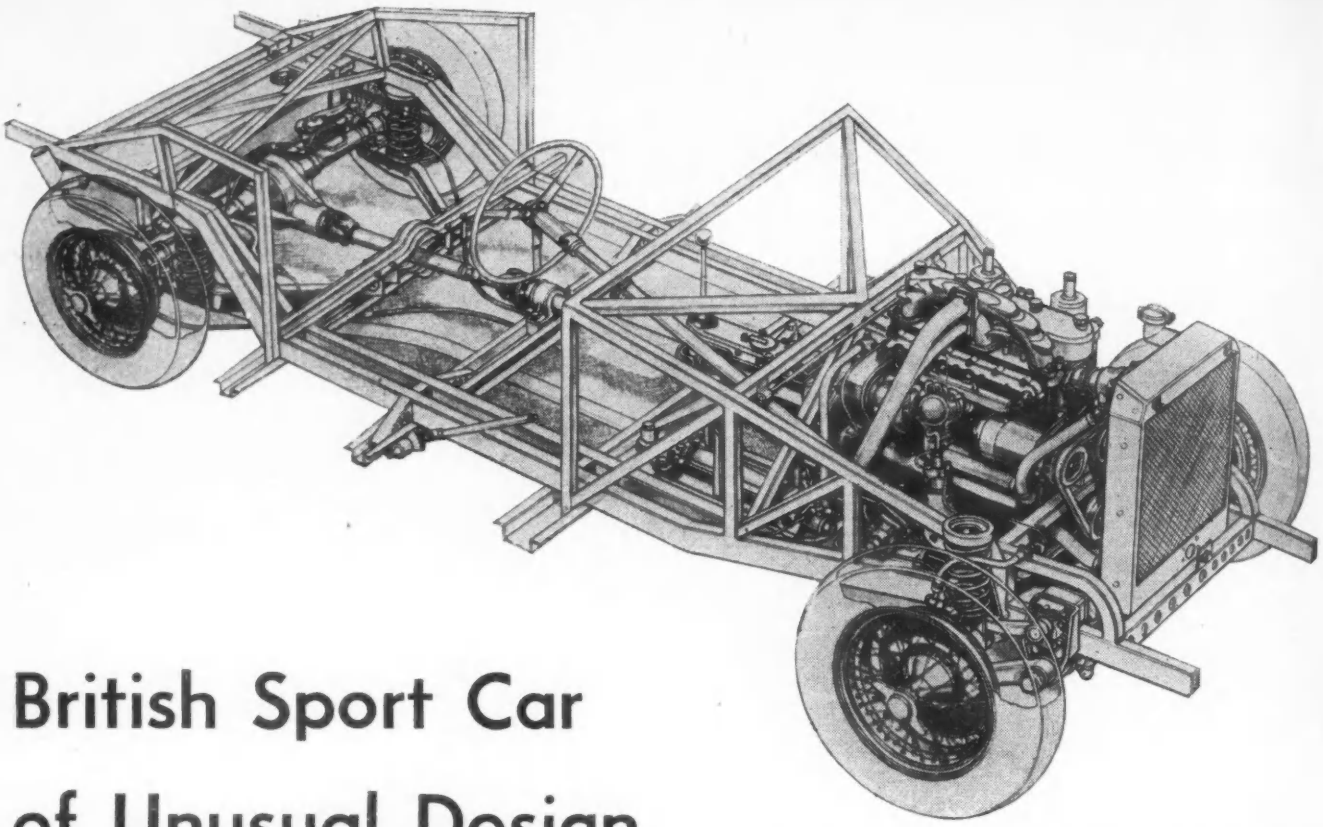


Fig. 4 (Above) The next step after grinding (Fig. 3) is to flame harden the cam contact surface to 350-400 Brinell. The special flame hardening machine illustrated has an automatic indexing table which moves the parts from the heating station in the background to the quenching station at the left and ejects in the foreground.

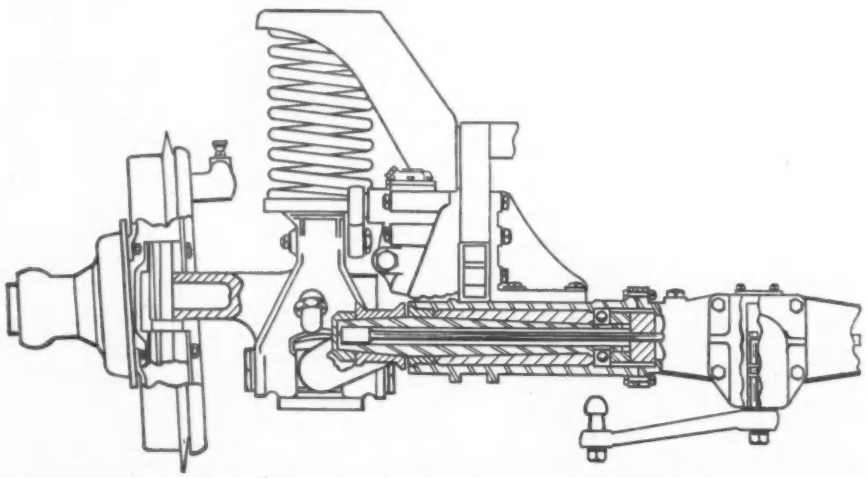


British Sport Car of Unusual Design

This general view of the new British Aston Martin sport car shows the unusual type of frame, coil-spring suspension for the rear axle, and part of the independent front suspension.

INTERESTING design features of the new Aston Martin, a four-cylinder British sport car, are a welded frame and chassis of unusual construction, front and rear coil-spring suspension, and the use of torsion bars to limit side sway. As shown in the accompanying drawing, the complete frame of this high-speed automobile consists of rectangular-section steel tubes welded together to form a light and strong structure. The design shown is for an open four-passenger body.

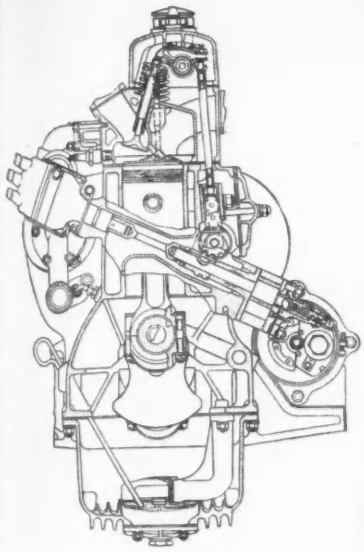
Independent suspension is used for the front wheels, each of which is mounted on a trailing arm attached to a long shaft housed inside a light-alloy tubular member running across the front of the frame. This shaft has one ball and one needle roller bearing. It is hollow and internally splined to one end of a torsion bar. The torsion bar forms an anti-roll device; it is joined to a similar shaft for the other front wheel so that independent movement of one wheel is resisted by the torsion bar. This device also serves to limit side sway of the vehicle. The coil spring is located between the trailing arm and a light-alloy housing which is bolted to the frame. Double-acting hydraulic shock absorbers are provided.

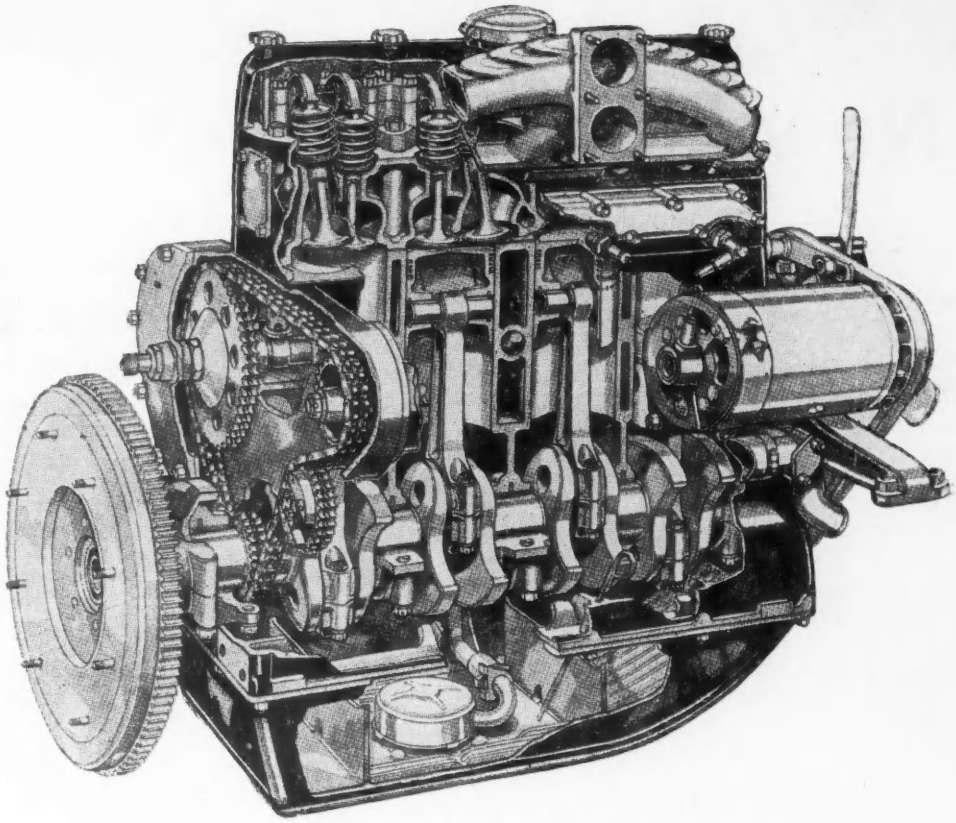


Sectional view of the tubular front cross member. This drawing shows how the front wheel is mounted on a shaft within a tube, and details of the torsion bar installation.

The rear suspension, although not independent, also uses coil springs in a manner similar to the installation at the front. To limit side sway, a torsion rod, attached to one end of the rear axle, is carried across the frame to a mounting on a side member. Double-acting shock absorbers are also provided in the rear.

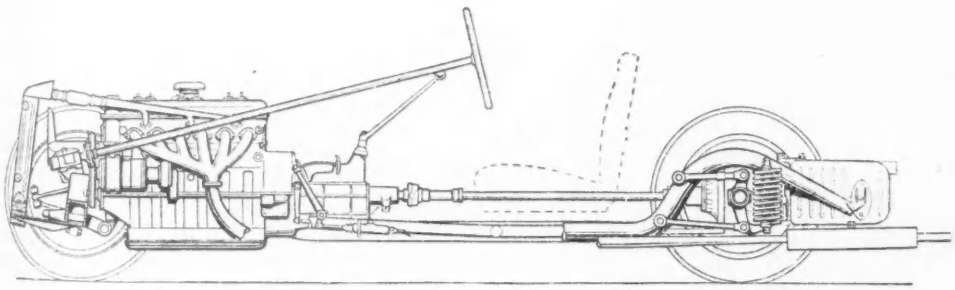
The (*turn to page 76, please*)

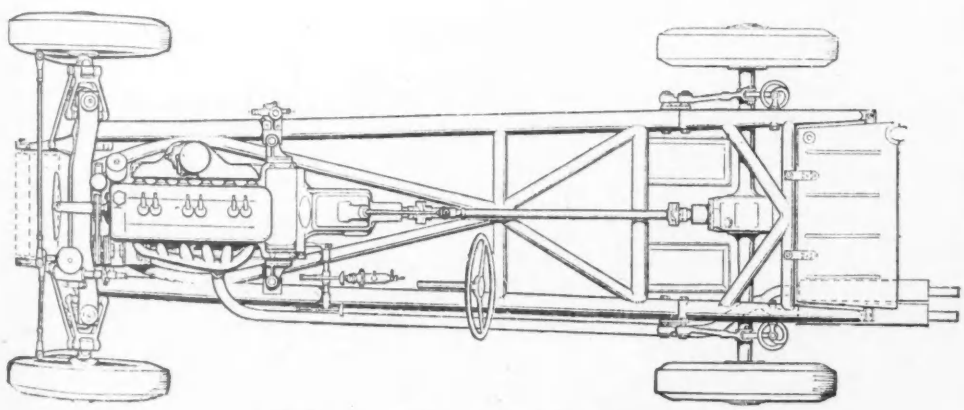




Cutaway and sectional drawings of the new Aston Martin engine with overhead valves actuated by short push rods from a camshaft located high at the side of the engine.

New Maserati Car Has Tubular Frame





(Drawing by courtesy of *The Autocar*, London)

UNUSUAL feature of the new Maserati A6, Italian sports and racing car, is the welded steel tubular frame. As shown in these two views, the frame consists of two longitudinal members supported by cross members and strengthened by diagonal tubing in the center. From the front, the frame slopes downward, so that the horizontal portion of the side members is well below the level of the propeller shaft and transmission. At the rear, the frame is carried upward and curved over the side tubes of the axle before dropping down to the rear cross member.

Other features of the Maserati A6 include an independent front suspension consisting of coil springs and long and short supporting arms, and a six cylinder overhead valve engine of 2.6 in. bore and 2.85 in. stroke. Compression ratio is given as 7.8 to 1; and power output claimed is 65 bhp at 4700 rpm. (Drawings Courtesy of *The Autocar*, London)

New Electric Shifter

Columbia's Latest Control Automatically Shifts Two-Speed Rear Axle to Low Ratio When Car is Stopped

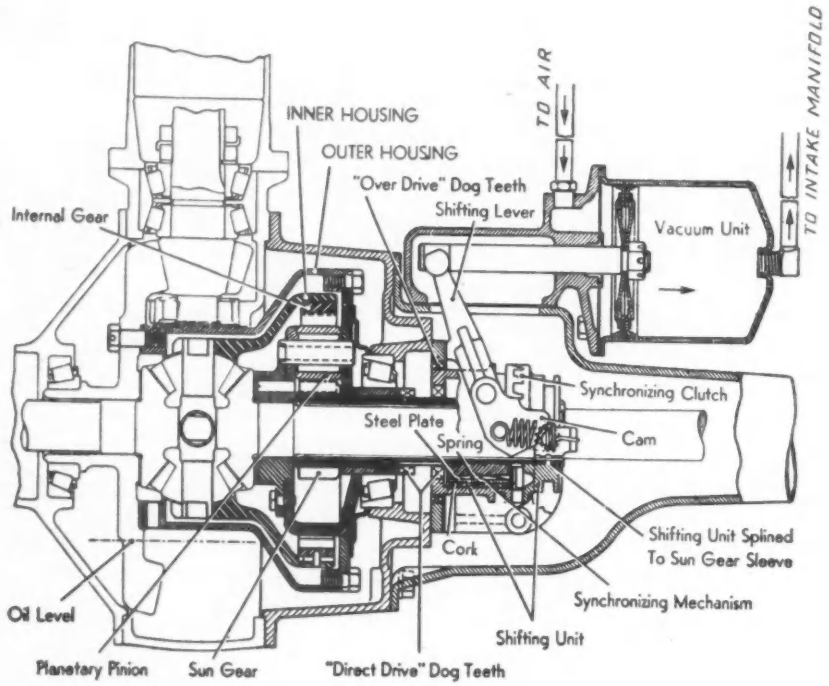


Fig. 1 Sectional view of Columbia "overdrive" as installed in Ford or Mercury rear axle.

AN automatic electric control, instead of the former mechanical one, is the feature of the 1948 Columbia "overdrive" for Ford and Mercury models, except 1949. It simplifies the control, the shift down from "overdrive" to "standard" gear ratio being accomplished automatically whenever the car is brought to a stop.

To shift from "standard" to "overdrive", the driver presses a toggle switch lever "down" and then pushes out on the clutch pedal. This allows vacuum power to shift the gears in the rear axle. As soon as the shift has been made the toggle switch is released and everything is set to return to "standard" ratio when the car is stopped.

The Columbia "overdrive" itself is not new. It is installed without changing any important assembly limits of the original rear axle. How the Columbia "overdrive" works can be understood by referring to Fig. 1. The shaded sections show the part supplied by Columbia. The unshaded portions of the drawing are the unchanged parts of the original assembly. The "overdrive" unit includes a new right-hand axle housing, the planetary gearing and the shifting mechanism. The outer housing of the planetary unit is bolted to the Ford or Mercury ring gear. This housing also carries the three planetary pinions. Surrounding these pinions is an internal gear which is mounted in an inner housing that drives the differential pinion cross, thus transmitting the drive to the rear axle shafts.

For direct drive, standard gear ratio, the sun gear is locked to the planetary pinions so that the whole mechanism revolves as a unit. On "overdrive", the sun gear is held stationary, locked to the axle housing. The bevel ring gear drives the pinions around the sun gear forcing the internal gear to rotate faster than the ring gear. The internal gear, as stated above, drives the differential cross and the rear axle shafts.

The new control units are both vacuum and electrically operated. An electrically-operated solenoid valve directs the vacuum to the proper side of the gear shifting piston. This valve is controlled by a switch on the instrument panel. Another "master" switch is connected to the clutch pedal so that the shifting can be done only when the clutch pedal is fully depressed. With the speedometer connected to the propeller shaft a false reading would be obtained when the overdrive is engaged. To correct this a small gear box is provided on the front of the dash with a new short cable to the speedometer head. The old cable is attached to the gear box. The shift is made by vacuum, see Fig. 2. The cylinder of the gear box is connected to the solenoid control and valves in the same manner as the vacuum shift cylinder on the rear axle.

A 3.78 to 1 gear ratio gives an "overdrive" ratio of 2.70 to 1 which makes an unusually quiet engine at ordinary road speeds.

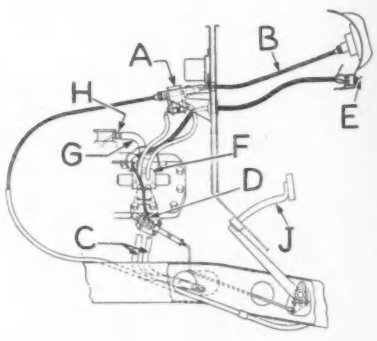
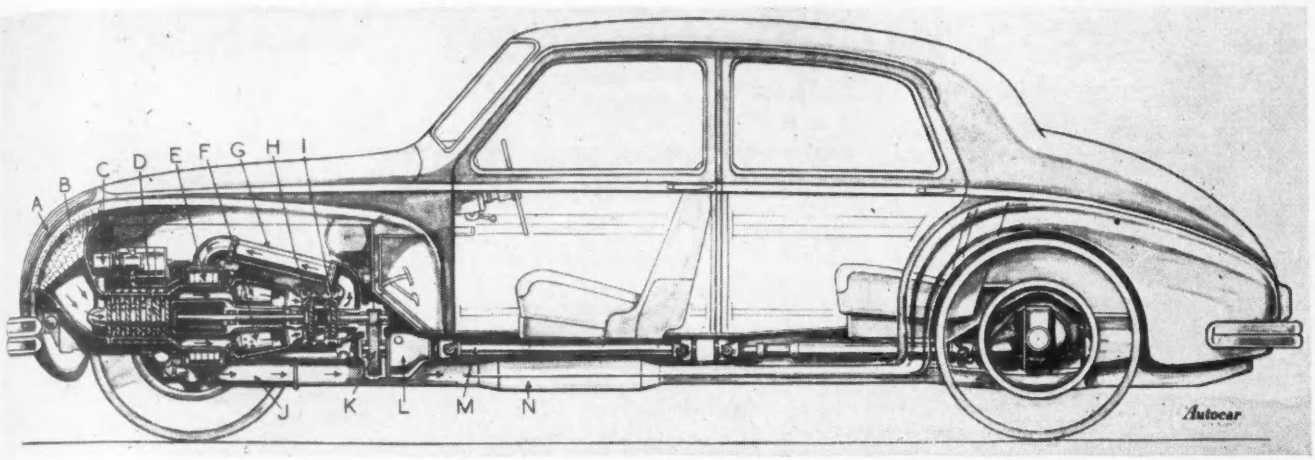


Fig. 2 Installation diagram showing electric switch on instrument panel, and location of auxiliary units.

(A) speedometer drive vacuum gear shift, (B) auxiliary speedometer cable, (C) tubes from vacuum valve to rear axle, (D) clutch pedal control switch, (E) toggle control switch, (F) solenoid vacuum valve (G) vacuum tube, (H) intake manifold, (J) clutch pedal.

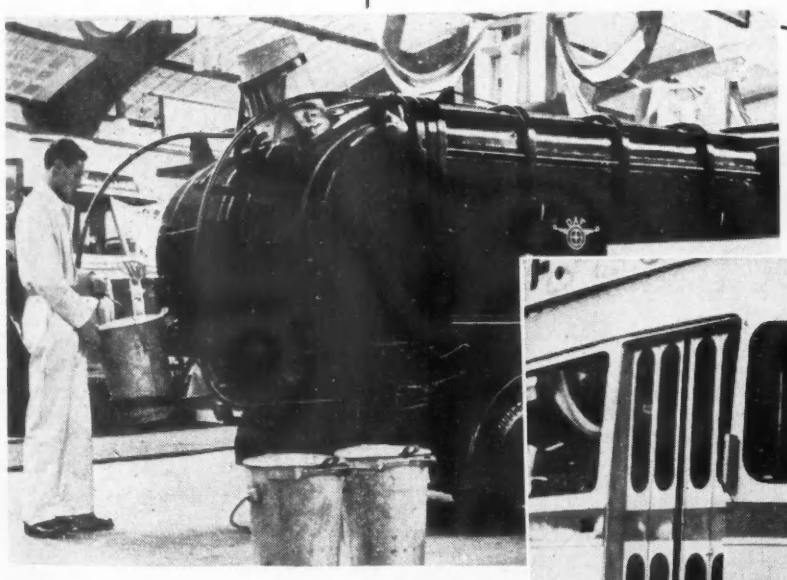
Gas Turbine Installation in a Passenger Car



Here is a schematic diagram of a possible gas turbine installation as shown in a recent issue of *The Autocar,* London, in a special article "More About Gas Turbines", by G. Geoffrey Smith. His article describes the Rover gas turbine unit, data on which were given in the June 1, 1948 issue of AUTOMOTIVE INDUSTRIES, page 32.

(A) air intake, (B) air filter, (C) drive to auxiliaries, (D) air compressor, (E) heat exchanger, (F) combustion chambers, (G) turbine efflux pipe, (H) compressor turbine, (I) power turbine, (J) exhaust from heat exchanger, (K) reduction gear, (L) reverse gear, (M) propeller shaft drive, (N) silencer.

Design Ideas from Europe



(Left) This special trash pick-up body, designed and built in Holland, is mounted on a Dodge truck chassis. It handles the standard ash cans required in Amsterdam. British Combine photo.

(Right) An unusual feature of this bus, built principally of American-made parts and units, is the pull-out sub frame on which the engine assembly and radiator are mounted. The chassis was made by van Doorne's Aanhangwagen Fabrick, the body by Verhaul. British Combine photo.

A New Low Temperature Rubber Made by "Antifreeze" Method

By G. G. Oberfell,
Vice President,
and R. W. Thomas,
Manager,
Research and Development,
Phillips Petroleum Company

THE considerable publicity attending the development of the new 41 F synthetic rubber (see AUTOMOTIVE INDUSTRIES, April 15, 1948, page 25) should not divert attention from an even newer development in the chemical rubber field. The newer development is a chemical rubber manufactured in an emulsion "antifreeze" system at the exceedingly low reaction temperature of 14 F.

Phillips Petroleum Co., which produced the first pilot-plant quantities of the new 41 F rubber, has also pioneered the development of the antifreeze rubber. American technical teams which visited Germany near the close of the war reported that the Germans "had plans" for attempting the preparation of antifreeze rubber using glycerine or glycol as the antifreeze. Apparently these plans were never carried out. Phillips attacked this problem with vigor in 1946 and developed recipes for the production of rubber at temperatures as low as zero F, using methanol as theantifreeze. It is felt currently that the most desirable temperature is 14 F for the production of the improved rubber in antifreeze recipes.

Phillips calls its 14 F antifreeze rubber development Philprene "B" as distinguished from the 41 F Philprene "A". On the basis of laboratory tests, Philprene B is substantially superior in important properties to the 41 F rubber and preliminary tire tests indicate even less wear. The commercial production of Philprene B type rubber is expected to become a reality in the not-too-distant future.

The name "low temperature rubber" applies only to general-purpose synthetic rubber made either just above the freezing point of water or in antifreeze systems. The statement is sometimes made that temperature alone is the main difference between the manufacture of regular GR-S at 122 F and these new low temperature rubbers. This is only part of the story, because entirely different recipes have had to be developed with meticulous attention to minute details in order to make feasible these improved low temperature polymers. The commercial production of rubber made with antifreeze recipes has introduced numerous problems not encountered in the manufacture of 41 F rubber. The problem of a more active polymerization system required for a suitable production rate at 14 F has been solved by the development of a new recipe which permits even faster polymerizations than are being obtained currently in GR-S manufacture at 122 F.

Another important problem involved in antifreeze polymerization is the recovery and recycling of the antifreeze. The use of glycerine and glycol as suggested by the Germans is impractical since there is no economic way to recover the antifreeze in commercial operations. Phillips introduced the use of methanol and developed a recovery and recycling system that is entirely feasible economically. The methanol is steam stripped from the 14 F rubber latex, separated in a decantor from water-insoluble ingredients, and reused. Methanol losses are low, which means that antifreeze rubber with its desirable properties should be able to compete economically with 41 F rubber and GR-S. Its superior properties should support the small increase in cost of manufacture.

It is sometimes stated that GR-S is not as "strong" as natural rubber. This statement is misleading because "strength" of an elastomer is a relative property that depends upon the way it is compounded. It is true, however, that the best GR-S compounds generally exhibit a tensile strength of 2800 to 3500 psi in tire tread stocks whereas the best natural rubber compounds have tensile strengths as high as 4,000 psi in tread stocks. The 41 F rubber exhibits tensile strengths in the same range as natural rubber while the 14 F rubber is actually "stronger" in the sense that tensile strengths in excess of 4,500 psi can be developed. In fact a special 14 F rubber has been prepared by Phillips which exhibited a tensile strength in excess of 6,000 psi with an elongation of nearly 600 per cent.

Phillips believes strongly in the future of chemical rubber and has greatly increased its research and development work in the chemical rubber field. The enthusiasm with which tire manufacturers are accepting the new low temperature polymers amply justifies that confidence. Although all of Phillips' rubber research has been privately financed, the results have been made available to the government and to many other companies interested in synthetic rubber. Phillips' technical personnel has assisted in the introduction of low temperature processes in both of the government-owned plants now producing low temperature rubber.

Consumers will naturally be interested in the availability of tires and other items fabricated from low temperature rubber. Items manufactured from 14 F rubber will not be available for some time although plans for limited commercial production of 14 F rubber in the government-owned synthetic rubber plant at Borger, Texas are well underway. This plant, which is operated by United States Rubber Co., is equipped to produce 14 F rubber at a rate of about 500,000 lb per month.

Since late February the government-owned synthetic rubber plant at Baton Rouge, Louisiana has been producing 41 F rubber (Ultipara) at a rate of about two million lb per month. This plant, which is operated by Copolymer Corp., was the first to produce commercial quantities of the low temperature rubber. Currently, the 41 F rubber produced in this plant is being purchased by the eight rubber companies owning the Copolymer Corp. Those companies are Lake Shore Tire and Rubber Co., Dayton Rubber Manufacturing Co., Mansfield Tire and Rubber Co., Armstrong Rubber Co., Armstrong Tire and Rubber Co., Gates Rubber Co., Lee Rubber and Tire Co., and Inland Rubber Corp. Lake Shore Tire and Rubber Co. has been a pioneer in developing tires from low temperature rubber. That company and Phillips were the participants in the first comprehensive tire test program which firmly established the merit of 41 F rubber in truck and passenger tire treads, and thereby started the "low temperature" bandwagon on its way. Lake Shore was the first company to combine the use of low temperature rubber and the new high abrasion furnace black (Philblack O) in truck and passenger tires.

NEW Production and Plant EQUIPMENT

For additional information regarding any of these items, please use coupon on page 58

M-11—Multi-Spindle Drillers and Tappers

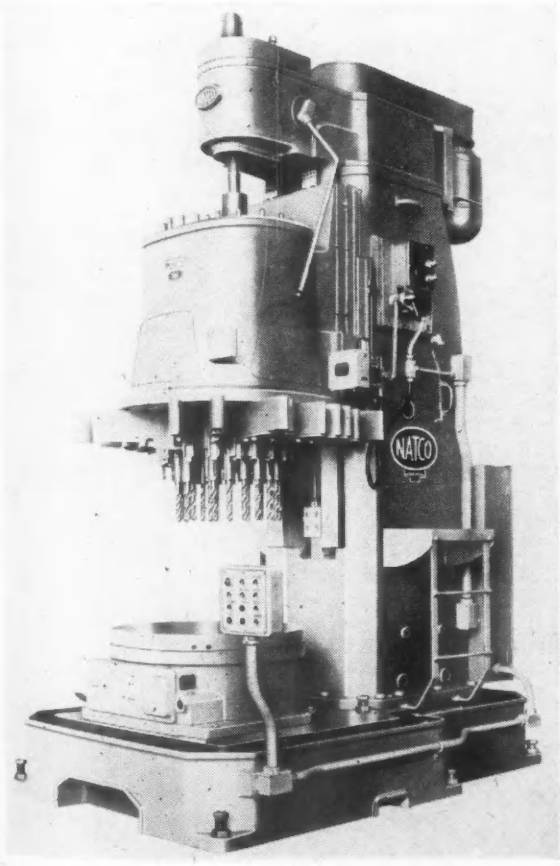
Models C2B, C3B and C4B NATCO Holesteel adjustable multi-spindle drillers and tappers manufactured by the National Automatic Tool Co., Richmond, Ind., are equipped with electrically controlled hydraulic feed systems, providing infinite feed range and pick-off change gears, and permitting a wide spindle speed selection.

Each model can be supplied with either of two similar bases. The small area base is supplied for adjustable table applications or for stationary fixtures mounted on the base; the larger area base is suitable for rotating and sliding type fixtures. Models C2B and C3B can be supplied with an adjustable knee type work table. Working area of the table is surrounded by a wide coolant channel which drains to the machine base.

A heavy box section column prevents deflection under heavy thrust loads. Ways are of close grain high tensile cast iron. The upper section forms a compartment, which encloses the hydraulic pressure pumps and all of the hydraulic system piping. The lower section encloses the head counterbalancing weight.

The neck is an anti-friction cascade lubricated gear chest driven by "V" belts from a foot mounted vertical motor. The neck drives both the adjustable spindle head and the hydraulic pressure pump. A shift lever located on the right side, operates a sliding gear which provides a 2.5 to 1 gear change and a neutral position. This permits stopping of the head drive shaft for set-up purposes.

Adjustable spindle heads are of anti-friction mounted construction, in which each spindle drive has independent spindle speed change gear. A cascade system is employed to lubricate the head. Guide ways, of ample length, slide on the column ways and are pressure lubricated at each cycle of the head. A tee slotted head flange is used to mount both adjustable spindle arms and slip spindle plates.



In this C4B NATCO Holesteel multi-driller and tapper, one of three models, two independent infinitely variable feed apertures control the feeds through a specified range. Working in conjunction with the feed aperture, a feed governor maintains the selected feed rate regardless of fluctuation in the tool resistance, change in hydraulic pressure, or breakthrough of the tools.

A step drilling attachment can be furnished. This allows the drilling of deep holes by increments of depth with a completely automatic cycle. A fully remote control for set-up use is available with push buttons for all phases of the cycle—rapid advance, coarse feed, fine feed, and rapid reverse.

M-12—Portable Shop Crane

A portable shop crane, known as the Hydro-Lift, is now available from the Cardinal Corp., St. Paul, Minn., according to company announcement. Of 2000 pound capacity, the Hydro-Lift is for use in machine shops, garages, industrial plants and foundries. The manufacturer states that its 45 in. boom makes installing or removing shop equipment easy. If greater boom length is desired, an 18-in. extension arm may be attached. Special locator pin locks the boom in working position.

Cardinal portable shop crane

A double acting hydraulic pump converts every movement of the pump handle into lift motion so that it requires little effort and time to hoist heavy loads. Neoprene oil-seals resist corrosion and will not leak. The crane holds its load at any height.

Fabricated of formed steel, the shop crane provides a stable platform. Three rubber-tired roller bearing wheels permit loads to be moved quickly and easily. Placing the towing handle in an upright position automatically sets the brake.

M-13—Semi-Automatic Thread Grinder

A new semi-automatic thread grinder has been developed by the Hanson-Whitney Machine Co., Hartford, Conn., which is said to provide uninterrupted, high speed, lower cost grinding of external threads.

Features include a master roll for maintaining the life of a crusher roll, which in turn crush-forms the grinding wheel with a wide variety of

multi-thread patterns which are then transferred to the work.

The multi-rib principle of crushing the thread pattern onto the grinding wheel is said to produce accurate, properly mated threads, close limits, and size duplication at the highest speeds.

The master roll transfers the original thread pattern (through the grinding wheel) to the crusher roll, when the crusher roll pattern has been worn down by repeated crushing of the wheel. Thus, the master roll maintains production making it unnecessary to send the crusher roll away for re-grinding.

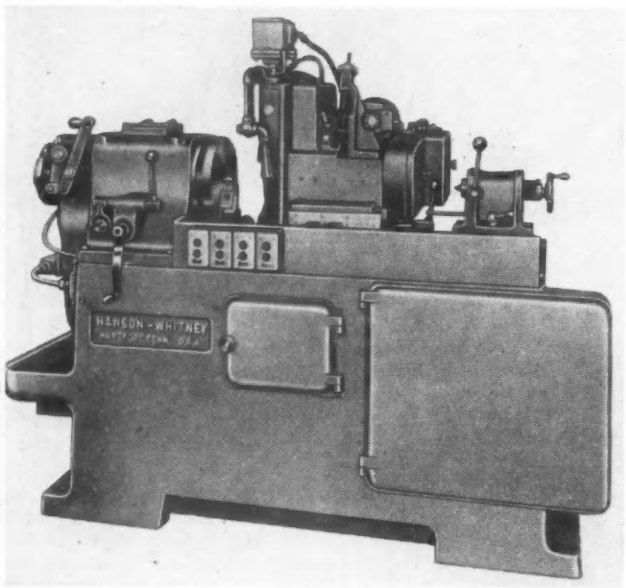
A crush-dressed multi-ribbed grinding wheel has been found to produce the complete length of thread within the capacity of the machine in the time required to produce one thread with a single point grinding wheel. The multi-ribbed wheel also is said to produce many more pieces per dressing, and results in uniform threads correct in lead, angle and diameter.

This machine is claimed to permit threading and forming of heat-treated material that is too hard to be thread-milled.

All operations of the machine, with the exception of work loading, are automatically controlled.

NEW Production and Plant EQUIPMENT

For additional information regarding any of these items, please use coupon on page 58.



Hanson - Whitney thread grinder

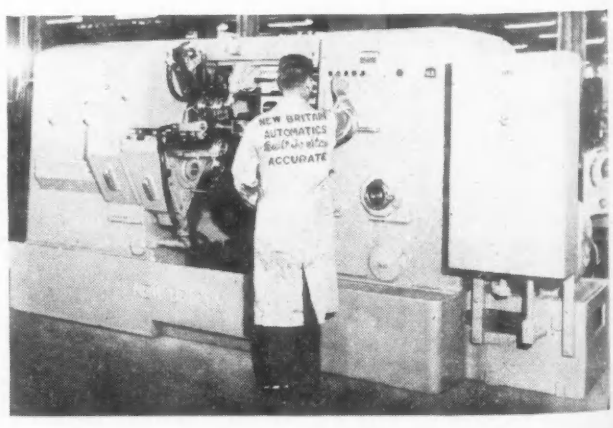
M-14—Automatic Screw Machine

The New Britain-Gridley Div. of the New Britain Machine Co., New Britain, Conn., has brought out a new Model 602 multiple spindle automatic screw machine. A large size companion to their new Model 601 1¼ in. automatic, this machine is built to handle carbide tooling and has a standard capacity of 2¼ in.

Its six cross slides are all radial to the center line of the spindle carrier and are 60 deg apart. This symmetrical radial arrangement gives the same line of forming thrust in each position and allows interchangeability of tool holders among the five heavy duty forming slides.

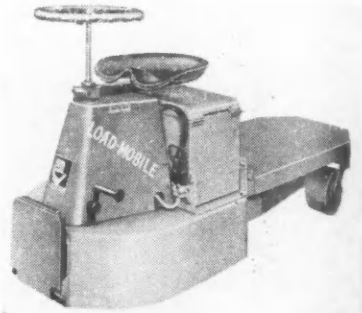
Cross slide cams are within the cross slide mountings and, being directly behind the slides, eliminate deflection. The increase in chips from high speed carbide production is taken care of by the wide open tooling area, large chip capacity in the pan, and a chip conveyor.

A universal main tool slide adjustment permits the selecting of any ratio of approach to feed without changing high point, drawback, stops, or total stroke. Stock feed out length is adjusted without changing any cams.



Model 602 New Britain multiple-spindle screw machine

M-15—Rider-Controlled Electric Truck



"Load-Mobile" electric truck

A rider-controlled electric lift truck called "Load-Mobile" is ready and in production according to Market Forge Co., Everett, Mass.

An advantage of this truck is that it may be handled in any one of three ways. For short hauls, where the operator must be on and off the truck quickly and conveniently—a folding step is provided. When the operator wishes to face away from the load—a swivel seat is quickly placed in this position. When he wishes to face the load (negotiating narrow aisles and dooorways)—the seat position is conveniently reversed.

Two speeds are controlled by a foot pedal. Control is "dead man" type. In use there is no speed restriction such as found when an operator must walk with a vehicle which may be either too slow or fast for his gait.

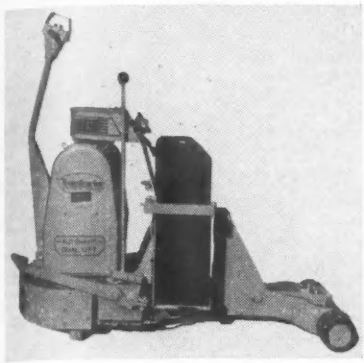
The unit is available in two models, 3000 lb and 5000 lb. Speed of the 3000 lb model averages approximately 3.5 mph, and that of the 5000 lb model, 3.00 mph. Platforms range in all lengths from 36 in. to 72 in. All units are 26 in. wide. Heights are 6, 7, 9 and 11 in., lowered. A full lift of 4 in. features all models. Lifting is by motor-operated hydraulic pump and a ram.

NEW Production and Plant EQUIPMENT

for additional information regarding any of these items, please use coupon on page 56.

M-16—Full Traction Lift Truck

The Transtractor, available from the Automatic Transportation Co., Chicago, Ill., is a new motorized unit built for users of live and semi-live skids. Its design is claimed to provide full driving traction when



Transtractor of the Automotive Transportation Co.

lifting heavy loads, maneuverability virtually equal to that of a hand lift jack, and capacity to handle skid loads of literally any size.

Trailing wheels and lifting arm are mounted on a specially-designed rear-end frame. In operation the wheels can enter beneath either a live or semi-live skid between the legs or wheels of the skid. Positioning of the lifting arm ahead of the trailing wheels is said to provide full traction when a heavy skid load is lifted. A 4000-lb load actually adds 60 lb of traction to the drive wheel.

The new truck is equipped with the Automatic dual lift, a new foot pump featured in Automatic's new 1948 line of Transporters. This pump is said to reduce by an average of one-third the foot pressure necessary to lift loads into moving position. It combines a low pressure (high speed) hydraulic cylinder for raising the lifting arm into contact with the skid and a high pressure (low speed) cylinder for raising the load.

M-17—Heavy Frame Metal Stitcher

The S-13-C Bostitch metal stitcher, a product of Bostitch, Inc., Westerly, R. I., is now equipped with a new heavy frame for added sturdiness, and also a new solenoid control, adjustable for single or continuous operation. Electrically operated, this foot-switch solenoid is said to add speed and safety.

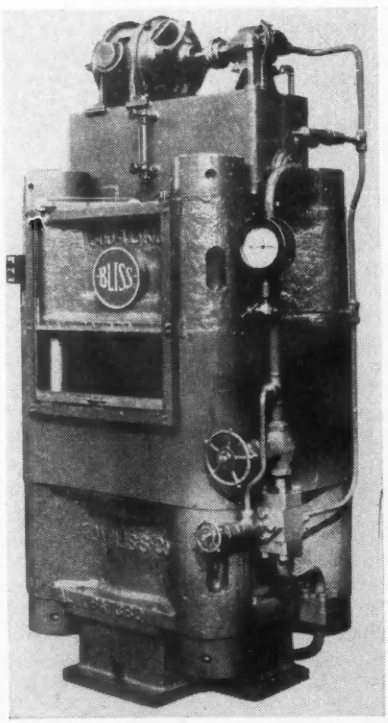
The S-13-C is used for stitching steel, aluminum, or other metals, metal to metal, or to other materials. Single 1/16 in. sheets of cold rolled steel or multiples up to .070 thickness are reported to have been successfully stitched.

Clincher is 45 in. above the floor. Weight is 585 lb; crated, 720 lb. Floor space is 16 in. by 40 in. The unit is equipped with ½ hp motor of 1725 rpm having V-belt drive.

M-18—New Die Hobbing Press

A die hobbing press has been added to the line of hydraulic presses of the E. W. Bliss Co., Detroit, Mich. Rated at 500 tons pressure at a pressing speed of 2 in. per minute, the press is used by manufacturers needing die reproductions in multiple stamping operations. Reproductions are obtained by forcing a master punch into metal blocks, the resulting cavities conforming exactly to contours of the master punch.

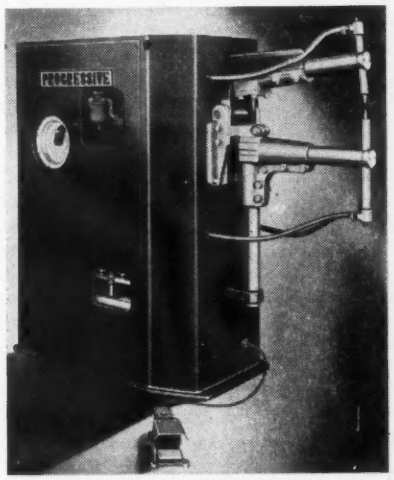
The press is completely self-contained. The frame consists of two steel castings mounted on four heavy steel tie rods. Safety shields are provided for all openings to the die space. Control of the press is accomplished by manually operated valves fitted with handwheels on the front of the press.



Bliss die hobbing press

M-19—Air Operated Rocker Arm Welder

A new and improved line of standard air operated rocker arm welders, in both 30 and 50 KVA capacities and with throat depths ranging from 18 to 36 in. for each capacity, has been developed by Progressive Welder Co., Detroit, Mich.



Progressive air operated rocker arm welder

The new rocker arm welders follow the structural principles incorporated in the latest Progressive pedestal and press type welders. The front part of the machine which carries the welding stresses is of heavy reinforced welded steel. The rear part of the machine serves mainly as an enclosure and is provided with quick removable panels for complete access to the interior.

The welders have three independent water cooling circuits for transformer, lower arm, and upper arm. Sight gages show circulation through an opening in the side of the machine. Throat opening features large range of adjustment. There is optional single operating cylinder or compound retractable stroke cylinder, interchangeable within the machine. A new compact air line accessory group is mounted within the machine but is visible through opening in the side panel. Heat control is externally accessible. Self-lubricating bearings eliminate virtually all maintenance other than supplying the air line lubrication. Water and air systems are completely piped to the rear of the machine, facilitating installation and maintenance.

All ratings and size classifications either conform to or exceed RWMA standards.

AIRBRIEFS

By ROBERT McLARREN

DOUGLAS COURAGE AGAIN

It's growing increasingly unusual in this business to find old-time "pioneering", the kind of effort that drives full speed ahead despite grave warnings by the treasurer. Donald Douglas is little better off than any of the other major airframe manufacturers and he's certain to lose millions on the DC-6. But Douglas just can't get "pioneering" out of his system: he loves the game too much. He drove full speed ahead with the DC-4 production line even after the Air Force had violated its solemn promise NOT to release C-54's to airlines until a year after V-J Day. Comes now the news that Douglas is going ahead with a straight cargo version of the DC-6 with no orders in sight! While other manufacturers are convinced that only with government money can they project a new aircraft, Douglas just can't hold back his restless desire to improve the breed. He says his DC-6A will carry 30,000 lb of cargo for a 9½ hour one-stop transcontinental flight for 4.7 cents a ton mile. The plane will sell for about $900,000 ($100,000 less than the passenger version), have wide loading doors, a 304 mph cruising speed and a 5340 ft takeoff.

SUPERSONIC ERA?

No, says Dr. Hugh L. Dryden, NACA Director of Aeronautical Research. The historic Bell XS-1 supersonic flights were made at extremely high altitude with a very small and very, very strong airplane. Flying a 7½-ton airplane at 40,000-60,000 ft with a design load factor of 18 is a far, far different job than flying a 50-ton craft at 5000 ft with a design load factor of 8 or so. Dryden says the big job ahead now is to produce combat aircraft capable of supersonic speed closer to sea level. Actually, the air loads at 60,000 ft are only a fraction of those at sea level. However, these loads even at high altitude are very real for both Air Force Capt. Charles Yeager and NACA research pilot Herbert H. Hoover reveal that they would have known they were at supersonic speed even without instruments in the cockpit. The high speed piloted research program has only met its first goal. Still to come is the exhaustive stability and control tests at sonic speed that comprise the real purpose of the program.

PARASITE FIGHTER

The unique McDonnell XF-85 fighter may prove to be a "parasite" in more ways than one for even though it has not yet made its first test flight its future has already become subject to debate. It stems basically from the current controversy over the huge Convair B-36A six-engined bomber and its place in the Air Force's strategic plans. True the giant craft has the longest range of any airplane ever built (10,000 miles) but the high speed action of any future war may rule it out of missions according to its critics. Air Force allocated a fixed sum to its development and the production of 100 airplanes. As development and production costs have risen, Air Force has cut back this quantity to hold the total committment the same. Current figure is 94 airplanes and Air Force is believed to have settled on 67 airplanes as the final total. This figure is the number of airplanes that can be built for the price of cancelling the entire project; i.e. it's cheaper to finish 67 than to cancel the entire program, believe it or not! The practical difficulties of operating the XF-85 parasite fighter in combat are enormous and stem from the possibility of its "mother" plane being shot down while the tiny fighter is in the air. The fighter pilot is equipped with ejection seat, "bail-out" oxygen bottle, electrically heated suit and German-developed "ribbon" parachute—but he is faced with landing on enemy soil, an unpleasant prospect. In the meantime, however, Air Force is readying the strange little plane for its first test drop at Muroc Air Force Base, Calif. from the belly of a modified Boeing B-29, there being no available B-36A bomber.

ENGINE BOOM

While the headlines have carried the story of the coming airframe production, there is hidden in these orders a tremendous upswing in aircraft engine production that will require new facilities and additional personnel by all the major producers. General Electric took the lead by leasing the wartime Wright Aeronautical plant at Lockland, Ohio, for the production of the J-47 (TG-190) turbojet engine scheduled for installation in the North American XF-86 swept-wing fighter. G-E will build about 1600 of these engines. Westinghouse is looking for a new facility in the Middle Atlantic area to build the 1000 or more J-34 (24C) engines it has contracted. Allison believes its present facilities are adequate but will need about 1000 new people over the next year to do the job of producing about 1800 J-33 (I-40) and 2100 J-35 (TG-180) jet engines. Pratt & Whitney is well into the jet business with orders for 400 J-42 (Rolls-Royce Nene) turbojet engines. As impressive as these jet engine figures look, however, neither the Air Force nor the Navy is making the full swing to the turbojet. Pratt & Whitney is signed up to produce about 2500 R-4360 Wasp Major engines, 450 R-2800 Double Wasp and 100 R-985 Wasp Junior engines, the latter for helicopters. Wright Aeronautical is committed to 900 R-3350 double-row Cyclones, 656 R-1300 and about 200 R-1820 single-row Cyclones. Wright claims adequate facilities but will need personnel. These engines also mean stepped-up output of generators, starters, pumps, spark plugs, ignition harnesses, etc., indicating booming accessory production. All of this materiel, although classed as "GFE" in the account sheets, means business all along the line to the smallest subcontractor. The real impact of the 70-Group program on the aircraft industry is yet to be felt and observers predict next summer as the real boom in the business.

VDT ENGINE

Installation of the Pratt & Whitney Wasp Major compound engine continues to grow with the Northrop B-35, the Boeing B-50C, the Lockheed P2V Neptune and the Lockheed Constitution as the latest recipients. In all of these types, range is paramount and latest figures indicate that a specific fuel consumption of 0.38 lb per bhp-hr can be achieved by this expedient of gearing the turbosupercharger back into the engine to utilize the energy of the exhaust gases formerly dumped overboard. This will mean about a 20 per cent range increase with the same fuel supply for these aircraft.

Shop men agree that Inland Hi-Steel can be readily welded by conventional methods including arc, spot, resistance, or flash methods.

The High-Strength Steel that Is Easy to Fabricate

Inland Hi-Steel can be worked and welded by conventional methods

THERE's no need to buy new fabricating equipment, redesign present machinery, or to change shop methods when you switch to Inland Hi-Steel.

This amazing high-strength, low-alloy steel is *ductile*. It can be worked easily, either hot or cold, with the fabricating equipment you're now using. Hi-Steel does not change its characteristics during normal cooling, but it can be heat treated, if desired. In addition, it is easily welded, sawed, sheared, punched, and machined.

Inland Hi-Steel has a working stress nearly twice that of ordinary structural steel, a fatigue strength approximately one-third greater, 4 to 5 times the resistance to corrosion, and high abrasion resistance.

An even higher yield point can be achieved in many applications by precipitation hardening, a simple low-temperature heat treatment. We will be glad to furnish you with additional information on this process.

To make larger tonnages available to you, other steel companies have been licensed to make this superior product. Write for Bulletin No. 11. INLAND STEEL CO., 38 S. Dearborn St., Chicago. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, and St. Paul.

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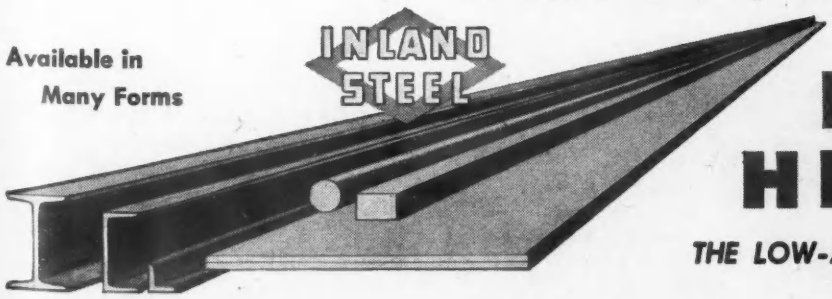


INLAND HI-STEEL

THE LOW-ALLOY, HI-STRENGTH STEEL

Latest Engineering Features of the Tucker

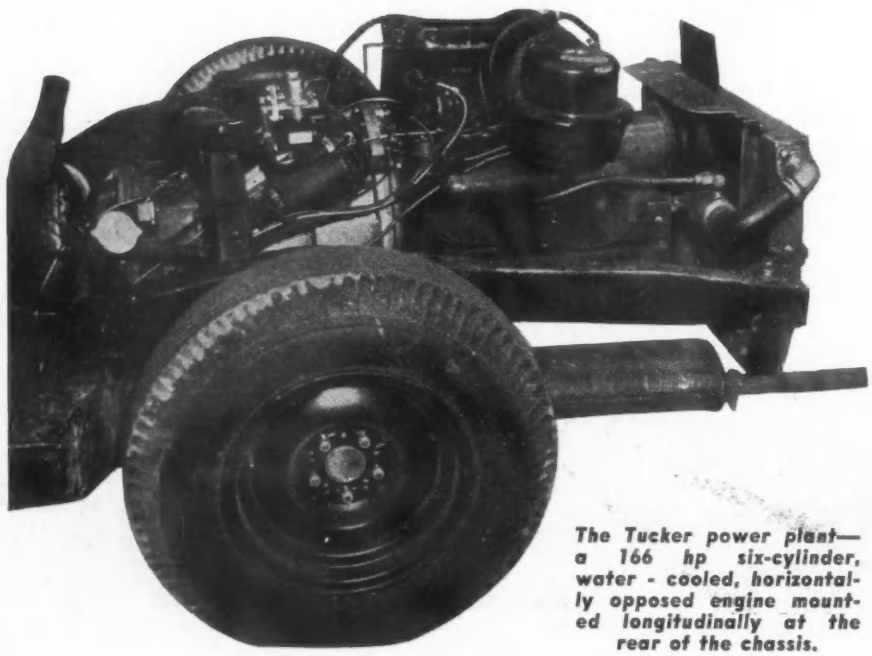
Engine, Transmission, Electrical System and Suspension Differ from Design Originally Proposed

AT a demonstration held in Detroit recently Preston Tucker, president, Tucker Corp. showed two cars having the latest engineering features and a stripped chassis showing current features of mechanical design, including what is said to be a unique automatic transmission.

In many respects the current chassis differs from the design originally proposed and described in the prospectus. The engine, for example, is a water cooled adaptation of the Aircooled Motors engine—a six-cylinder, horizontally opposed engine rated at 166 hp without accessories. Engine mounting is longitudinal instead of transverse as in the original design, the unit being mounted back of the rear wheel centers. A conventional radiator—wide but low in heights—is mounted behind the engine. Although the engine is equipped with a standard carburetor, a press notice implies that solid fuel injection will be offered later as optional equipment.

The transmission setup is optional, the automatic transmission being offered as special equipment. The automatic transmission is mounted directly to the engine and is said to combine characteristics similar to torque converters and automatic transmissions in a device of simpler mechanical design. Although details of the unit have not been released, it is said to consist of a planetary gear set in combination with a fluid coupling at the flywheel end and a second fluid coupling at the other end, the latter being used for control. To effect smooth engagement without slippage and loss in efficiency, the applied torque is divided between the gear set and the main fluid coupling in such fashion that the gear set takes over only when maximum torque capacity of the coupling has been approached.

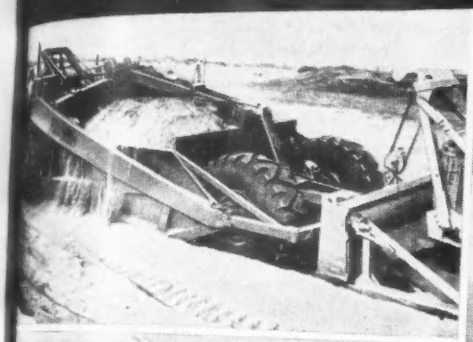
Stripped Tucker chassis showing location of power plant and seats.

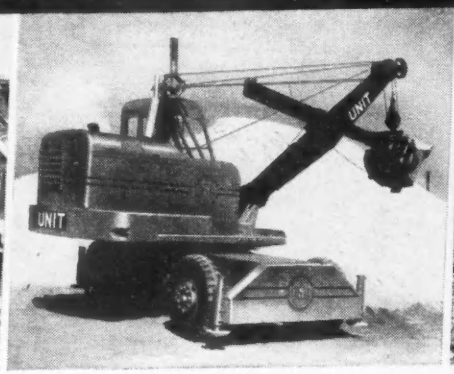


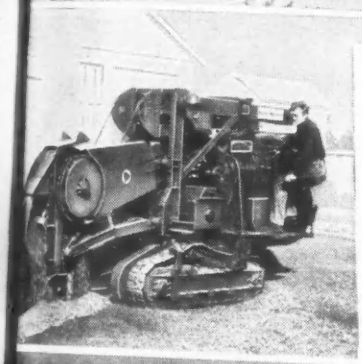
The Tucker power plant—a 166 hp six-cylinder, water-cooled, horizontally opposed engine mounted longitudinally at the rear of the chassis.

The design is unique in that the planetary is not controlled by brake bands as is customary. Dash control with automatic drive has only three positions—forward, neutral, and reverse — without provision of emergency low that is a feature in current automatic transmissions. The unit has no special provision for cooling owing to lack of excessive generation of heat. It is claimed that the maximum temperature encountered in severe operations has been around 225 F, while the unit can stand up to 350 F without difficulty. A feature of the unit is an anti-creep brake which comes in automatically to hold the output shaft when the en- (*Turn to page* 90, *please*)

At the ROAD SHOW... you will see that VICKERS HYDRAULIC CONTROLS predominate on the MOST MODERN EQUIPMENT





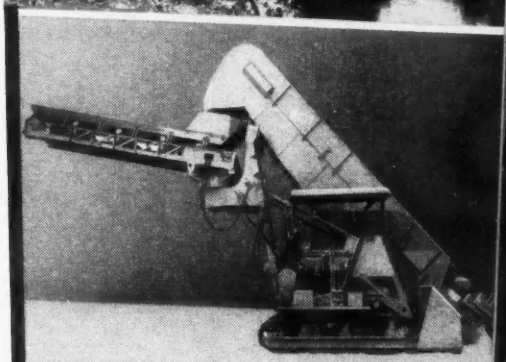


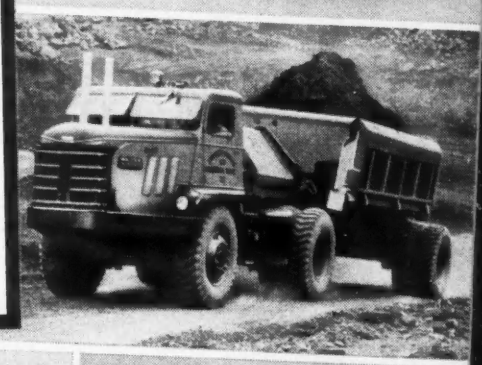
Shown here are typical examples of equipment to be exhibited which follow the decided trend toward Vickers Hydraulics for all types of Construction Machinery.

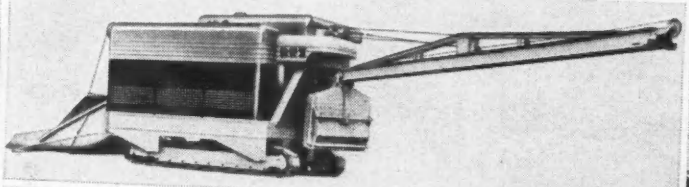
Important among the many advantages of Vickers Hydraulic Controls, is the inherent overload protection enabling the operator to work as fast and crowd as hard as he likes without fear of damage to the equipment. Any sequence and combination of movements are easily provided . . . any desired amount of power can be applied wherever needed. Fast, accurate, simple, dependable . . . these are other features of Vickers Hydraulic Steering and Control Systems.

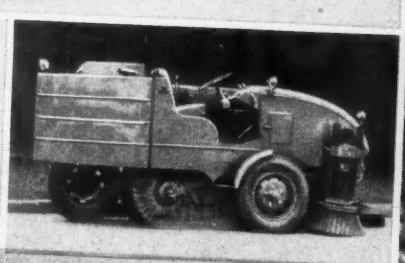
Note the many Vickers Applications when you visit the Road Show . . . then see the Vickers exhibit in Booth 1404. Our engineers will be on hand to discuss problems in hydraulic controls which you may be considering.

3577









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P-17—Fractional HP Motor Mount

The Lord Mfg. Co., Erie, Pa., is featuring a new FHP motor mount for original installation on ¼ and ⅓ hp capacitor motors. The new mounting is of one piece construction, requiring no bolts, nuts, straps or special tools for installation, and is said to be quickly slipped into

Lord fractional hp motor mount

place on the assembly line. The mount fits N.E.M.A. standard bases.

It is stated that the mounting combines a high degree of isolation of torsional vibration, with necessary vertical and horizontal stiffness to give stability to the entire assembly.

P-18—All-Purpose Carbide Bushings

A new line of standard all-purpose carbide bushings has been released by Carboloy Co., Inc., Detroit, Mich. Various sizes of these bushings are already in use as wire guides, and as bushings and collets in Swiss Automatic machines. They are also adapted for valves and orifices in spray gun nozzles; as plug gage bushings, especially on extremely fine instrument work; on guide rolls and feed rolls; and as bushings on drill jigs.

Bushings in Group A are relatively short, ranging from ⅛ in. to ½ in. in length; 1/16 in. to 1 in. ID and ⅛ in. to 1⅜ in. OD. The smaller sizes of this group of bushings come in standard package quantities. Bushings in Group B are comparatively thick and long, ranging from ⅞ in. to 1 in. long; ⅜ in. to 2⅜ in. ID; and 11/16 in. to 3 in. OD.

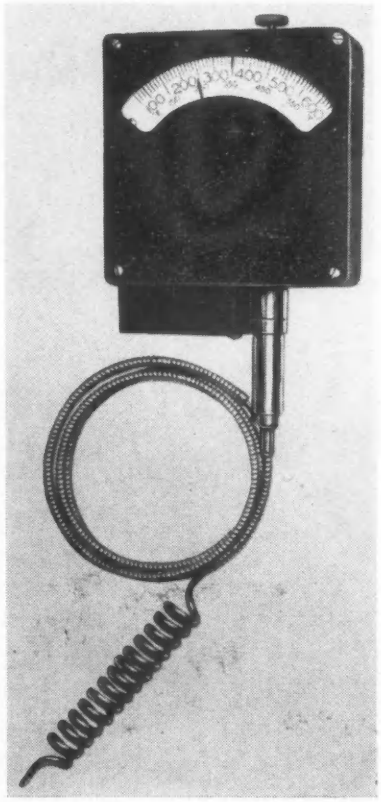
The smaller sizes of all-purpose bushings in Group A are standard in Carboloy grade 883. The larger sizes in Group A and all bushings in Group B are furnished in Carboloy Grade 44A.

NEW ★ PRODUCTS

For additional information regarding any of these items, please use coupon on page 58

P-19—Temperature Controller

The United Electric Controls Co., Watertown, Mass., has built a new indicating temperature controller. It is designed for installations such as mechanical convection type ovens,



United Electric Co.'s temperature controller

liquid baths, hot plates or molding dies, where accurate temperature control of gases, liquids, or metal-to-metal applications is vital and where periodic visual checks are required, advisable, or time-saving.

Basically simple in operation, the new indicating temperature controller applies the highly sensitive response motion of a solidly liquid filled bulb and bellows assembly to a snap-acting switch. In addition, any of the numerous standard remote bulb assemblies may be used, making it possible to install the new control in many locations heretofore considered too tough for an indicating control.

By turning a thumb screw in the top of the case the upper indicating pointer may be precisely set at any desired temperature cut-off point over the specified range. The dial face may be read from a distance of ten or twelve feet.

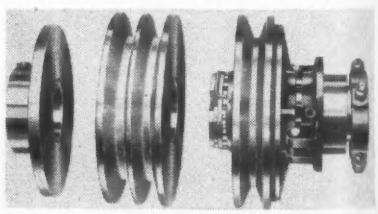
Overall dimensions of the case are 5½ in. by 5½ in. by 1¾ in. and the control weighs 3 lb. Adjustable mounting lugs are provided on the case for either flush or surface mounting. The standard model of the new indicating temperature controller is fitted with a copper bulb assembly. Other assemblies in stainless and mild steel are available. Two standard ranges +50 F to +350 F and +50 F to +600 F are offered, or special ranges may be had between the limits of −120 F to +600 F. Standard differentials available are from ½ F in circulating liquid to 2 F in air. Switch ratings of 10 amp 125 V AC and 5 amp 250 V AC are offered with other electric load ratings available.

P-20—V-Belt Clutch Pulley

A new self-contained V-belt clutch pulley with the pulley an integral part of the clutch assembly is a recent development of the Edgemont Machine Co., Dayton, Ohio. The Clutch permits new applications in small portable conveyors, and special machinery using V-belt or chain drives.

The clutch is furnished in ratings of ¼ and ½ hp at 100 rpm and in shaft sizes from ¾ in. to 1¼ in. It is available from stock with V-belt pulleys with one "B" groove of 3½ in., 4¼ in. and 5 in. P.D., or with two "B" grooves of 4¼ in. or 5 in. P. D.

When the clutch is disengaged, the pulley runs freely on its shaft. To



Edgemont V-belt clutch pulley

engage the clutch, an induction hardened cam moves two drop forged levers which move a friction plate axially against the liner and thus engages

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All three Permatex Form-A-Gasket Sealing Compounds make every type of assembly leak-proof and pressure-tight . . . be it threaded, flat or flanged. They all prevent corrosion and are leak-proof to gasoline, fuel oils, lubricating oils, hot or cold water, all types of anti-freeze and numerous other liquids and gases. Use the one that best fits the job.

Permatex Form-A-Gasket No. 1 (a paste) dries fast and sets hard, but never becomes brittle. Makes tough, permanent unions even with warped or pitted surfaces.

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Permatex Aviation Form-A-Gasket No. 3 (a brushable liquid) quickly dries to a tacky paste. Since it acts as a lubricant before it seals, threaded connections can be tightened up all the way without binding. Unions are easily disassembled. Will not run at 400° above nor become brittle at 70° below.

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the pulley, which is restrained from axial movement by an adjusting collar. A snap ring on the adjusting collar engages with notches on the rim of a steel washer keyed to the clutch body and hence take-up for wear is accomplished by positive "indexed" adjustment, rather than by guess work.

When the cam is moved to disengage the clutch, centrifugal force on the levers tends to remove the force on the friction plate, making the release fast and positive. Self-lubricating bushings are used in both the pulleys and adapters.

P-21—Strap Stretcher and Sealer

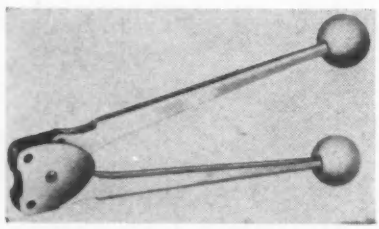
The Acme B2AO stretcher and C2A sealer are two new tools for the strapping field, products of Acme Steel Co., Chicago, Ill. Designed specifically for insulation work and

Acme B2AO stretcher

for bundling and tying units of small diameter, these tools have successfully applied a tight strap to solid steel rod one in. in diameter, according to the company. Both the stretcher and the sealer can be used on either compressible or non-compressible surfaces.

The stretcher, weighing 2¾ lb., accommodates ⅜, ½, ⅝ and ¾ in. steel strap. When the tool is tilted upward, the strap is broken off at the sealed joint.

During operation of the sealer the jaws crimp the seal and move the



Acme C2A sealer

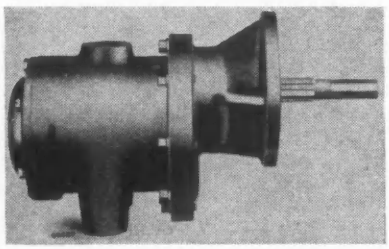
crimped portions up, this action facilitating application of strapping to small diameter units. Since the jaws do not go under the seal no strap tension is said to be lost. The sealer is made in four sizes to accommodate strap widths. Weight is 2 lb.

NEW ★ PRODUCTS

For additional information regarding any of these items, please use coupon on page 58.

P-22—Air Motors For Engines

Ingersoll-Rand Co., New York City, N. Y., is now producing air motors of two sizes as starters for internal combustion engines. The air motor is keyed or splined to the Bendix or starting mechanism and cranks an engine in the same manner that an electric starter cranks an automo-



Ingersoll-Rand air motor

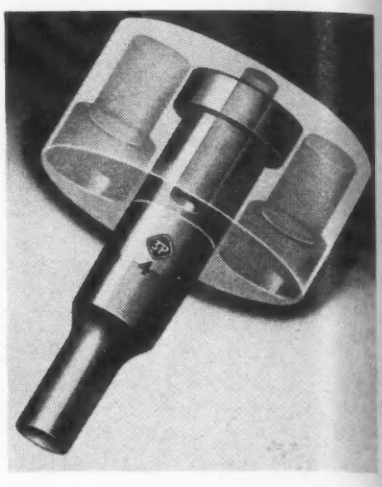
bile engine when turning it over.

The starting motors are known as the size 9BM and size 20BM, the former having 9 hp and the latter 20 hp at 90 lb per sq. in. air pressure. They have an overall length of only 13 3/16 in. and 14½ in. Air motors are of the "Multi-Vane" type and the throttle valve is of the quick opening type to give peak horsepower almost immediately. A single step spur gearing is used to obtain suitable speeds.

P-23—Head Type Punches and Retainers

A new line of head type punches and punch retainers is the latest addition to Porter Precision Products, Cincinnat, Ohio. These head type punches are made from select tool steel and are 100 per cent Brinnell tested. The first four series are furnished in a minimum length of 1½ in.

A companion line of round type retainers for these punches are optional in two sizes. Retainers are



Porter head type punch and punch retainer

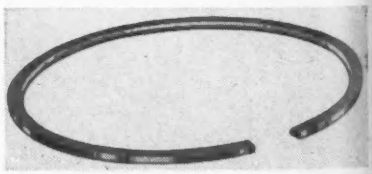
furnished in a high tensile, yet machinable, steel. A light press fit on punch body is allowed which firmly holds the punch and is said to reduce shattering action to a minimum.

P-24—Special Alloy Piston Ring

Wilkening Manufacturing Co. of Philadelphia and Toronto is offering a new Pedrick chrome-faced piston ring claimed to have high anti-friction and lubricant-retaining characteristics of the chrome face in both heavy-duty high temperature service, and where abrasive dust is present.

To insure wearability of the chrome a new metal is said to have been developed for the ring. A special alloy, it is centrifugally cast, then heat-treated to produce a dense, uniform structure which is tough and resilient, with high tensile strength. The alloy is said to be safe from breakage even under very heavy loads because it is not subject to hydrogen-embrittlement.

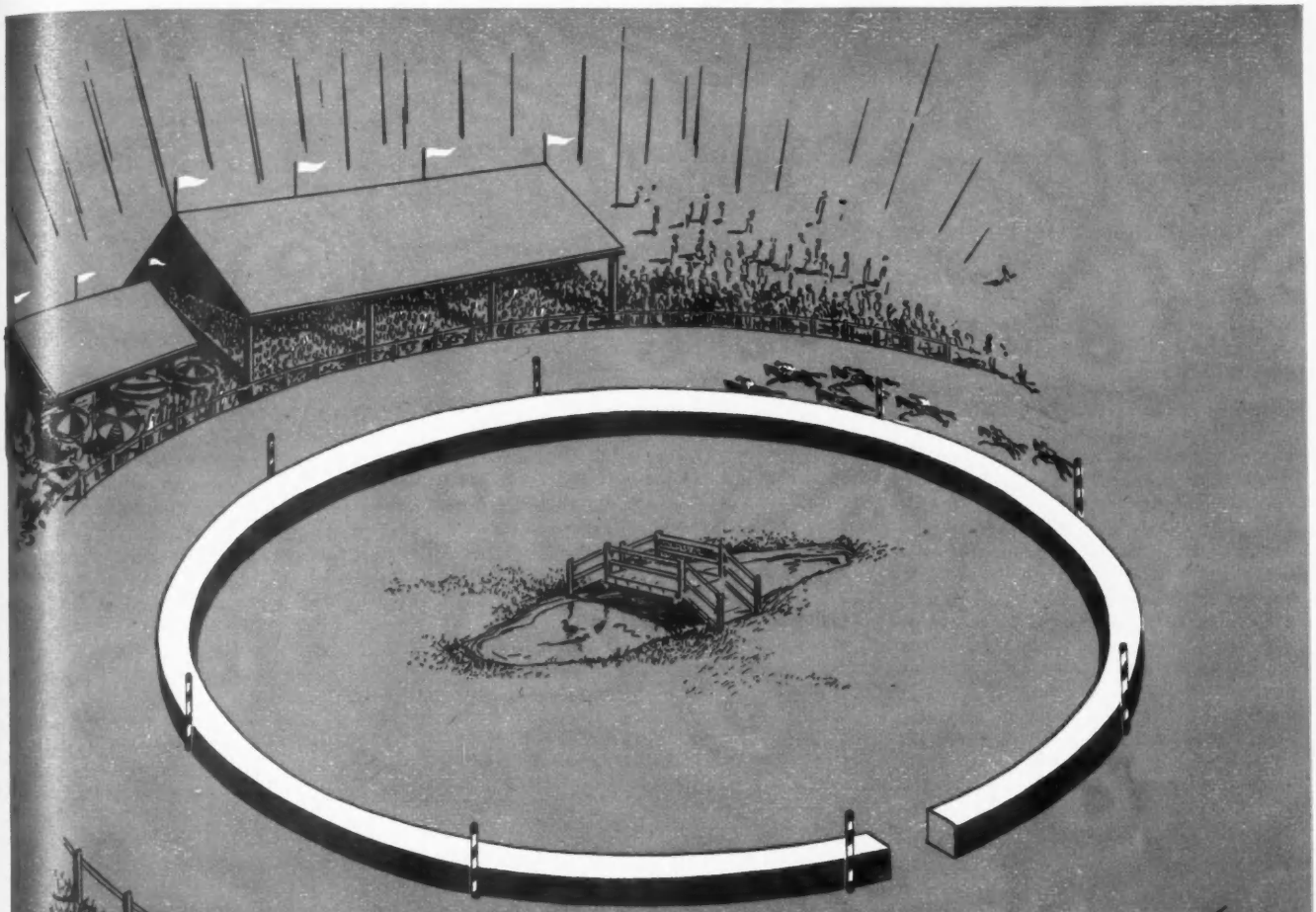
A Pedrick twist-seal design provides definite point contact between the face of the ring and the cylinder wall, and between the sides of the ring and the sides of the piston



Wilkening Company's new piston ring

groove. This design combined with the chrome-plating and special alloy are claimed to effectively seal the cylinder against blow-by.

(*Turn to page 94, please*)



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SEALED POWER PISTON RINGS

PISTONS • CYLINDER SLEEVES

OBSERVATIONS

By JOSEPH GESCHELIN

Surface Finish

The paper on the present status of surface finish control presented by C. R. Lewis, Chrysler Corp., marks the first official report of the SAE committee charged with responsibility for developing standards for roughness and character of surface finish. Contributing to this program General Motors Research has under development what it terms "Gold Standard Samples". In effect they are making up a series of standard metal plates, each one representing a specific roughness. Roughness of each master will be calibrated to an absolute value and can be used for the calibration of instruments for measuring surface roughness. This should be of immense value in furthering the art.

Rubber Conductor

Phil Kent mentioned at the SAE French Lick meeting an outstanding development in ignition systems subject to further experimentation. This is the use of a new type of high tension ignition cable having a core of special conducting rubber formulation covered with rubber insulation. The cable has high resistance, making it suitable for systems suppressed to reduce interference with radio and television reception, also pointing to the possibility of dispensing with spark plug suppressors, according to Kent.

Modern Approach

If any one still thinks a spark plug is simply an assembly of screw machine parts, electrodes, and ceramics that illusion is dispelled by the masterly review of its role in combustion by Cipriani and Middleton of Auto-Lite. A dazzling perspective of the modern concept of combustion phenomena, ionization, radiations, etc., may be hard to grasp except by the physicist but it certainly demonstrates there is more to firing an active mixture than initiating a spark. From a practical standpoint such scientific research should have a large bearing upon improvement in engine performance.

Spot Light

Col. Colby made a generous gesture at French Lick to show appreciation for the work done by certain motor car organizations in the current Ordnance development program. During the talk he directed a spot light on several individuals responsible for specific achievements mentioned in the paper. Here are a few of the credits: E. R. Lamb, Chrysler Corp., for his work on the development of the ¾-tonner; M. A. Thorne, General Motors Corp., for the development of the enormous five-tonner; O. K. Kelley, General Motors Corp., for his work on torque converters; Phil Kent, Chrysler Corp., for electrical and ignition contributions.

Now Defined

As technology advances it is sometimes necessary to clarify terminology. At the materials session it was noted that some confusion may result from the present use of the term "supersonic" when applied to entirely different concepts of the speed of sound. Since in the popular sense the term supersonic is associated with jet planes, it has been decided that instruments designed for non-destructive testing and employing sound waves should be called "ultra-sonic" devices instead of supersonic as at present. Whether or not the manufacturers of such instruments will agree is a matter for further discussion.

Cylinder Heads

We were interested to learn at the engine session that Nash is considering adoption of a permanent mold aluminum cylinder head for the valve-in-head Ambassador Six engine. Present experimental work indicates the possibility of making permanent mold castings to such close tolerances on dimensions and surface finish as to eliminate virtually all machining.

V-Type Engines

There appears to be considerable interest in the development of a V-type six-cylinder engine. One of the principal advantages would be rigidity of structure and a less flexible crankshaft what with the advent of high compression ratios. It will be interesting to study the advantages and limitations of this design as well as comparison with the flat six which has been built by a number of engine producers for a great many years.

Elbow Room

With the big push to the new look in bodies both front and rear seats are becoming wider. Now is the time to make some ground rules—a standard yardstick—for comparative body dimensions. We are told by one chief engineer that the present AMA criterion for seat width, namely, the width as measured on a line five inches from the back of the seat does not give a true picture of usable hip room. To get a real comparison one must take into account the interference of arm rests. In fact, we gather that the real criterion of customer comfort is shoulder room. It might be better to rate according to the actual width at average shoulder height across the body, thus taking into account variations in trim treatment as well as body curvature. In any event we need a uniform standard which will truly compare one make of car with another from the standpoint of the consumer.

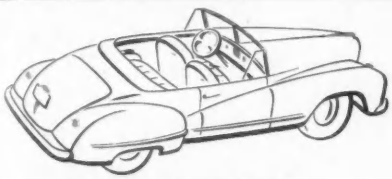
Ket Engine

Judging by comment around Detroit there is little doubt that some new engines groomed for '49 or '50 models have a basic structure designed with an eye to the greatly increased loading incident to compression ratios of around 12 to 1 at the top. As introduced these engines necessarily will have lower compression ratios. But they will not require a major operation to achieve the higher limits.

Torque Converters

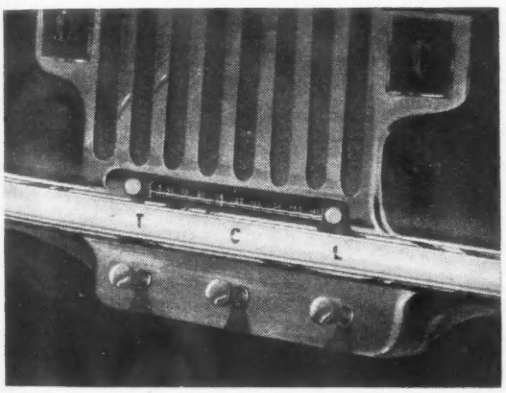
Although it will be some time before Packard announces the details of its automatic transmission, speculation has it that the job is of torque converter type. If true, that is not surprising considering the general trend at the present time. It is noteworthy that torque converters already have had considerable application in drives for buses, for marine installations, and passenger cars, not to overlook their potential for military vehicles.

WHY USE "LUCITE" FOR MICRO*STYLING?

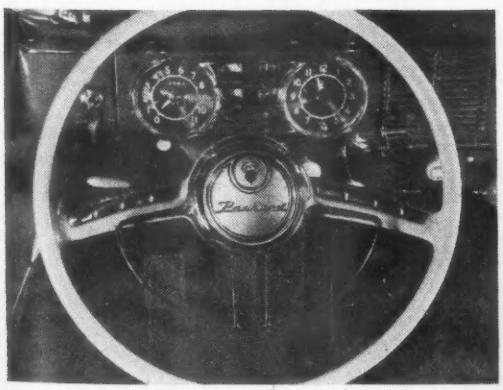


***WHAT IS MICRO-STYLING?**

MICRO-STYLING is the design of small but important automobile accessories for beauty and utility too. A smart, sturdy horn button . . . a crystal-clear dial face . . . a sparkling tail-light lens . . . many *little things* are bound to impress car buyers. They'll help re-sell your make of car again and again. All-important MICRO-STYLING calls for the best in quality materials . . . and that means Du Pont "Lucite"!



A glowing rod of crystal-clear "Lucite" pipes a beam of light under instrument panel, lights choke, throttle, and headlamp switches. Rod brings light around from bulbs behind the panel. It's an idea for MICRO-STYLING that may help sell the car.



This handsome horn button is one of 15, made of "Lucite," on today's cars. It's an example of the beautiful three-dimensional color effect that can be obtained with this Time-Tested plastic. (1948 Packard horn button molded by Hoosier-Cardinal Corp., Evansville, Ind.)

For the "luxury touch," 17 of today's most-wanted makes of cars feature 99 parts made of the Time-Tested plastic.

For long-lasting beauty and utility, too . . . for the extra good-will that helps build repeat sales, you can't beat Du Pont "Lucite" acrylic resin in MICRO-STYLING your car.

Consumers are impressed by accessories of "Lucite." It has a quality look and feel . . . and it's durable. The superior features found in "Lucite" combine to give a true *luxury* impression.

"LUCITE" HAS LONG-LASTING COLOR

A distinctive variety of color-fast hues is available—transparent, translucent and opaque. They hold their beauty through years of weathering and hard service. They have since 1937.

"LUCITE" HAS SPARKLING TRANSPARENCY

Smart, practical lenses, dial faces, etc., of crystal-clear "Lucite" transmit up to 92% of light. "Lucite" can be "edge-lighted," and will "pipe" light around curves.

"LUCITE" HAS LUXURIOUS SMOOTHNESS

Consumers are quick to notice the smooth, warm look and feel of handles, knobs, horn buttons and other pieces made of "Lucite." It's not brittle . . . and it withstands sharp knocks.

"LUCITE" HAS EXCELLENT DURABILITY

Accessories of "Lucite" give top service for years and years . . . retain full beauty and utility inside and out. In normal use, it isn't damaged by gasoline or lubricants, or by many common solvents that cause crazing in less durable plastics. "Lucite" parts are readily molded and machined.

DU PONT
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Plastics
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

WRITE FOR FREE LITERATURE . . . on "Lucite" and other Du Pont plastics. No obligation. If you wish, Du Pont technical men will be glad to consult with you in confidence and advise on applications of Du Pont plastics to help your MICRO-STYLING plans. Address E. I. du Pont de Nemours & Co. (Inc.), Plastics Dept., Room 207, Arlington, N. J.

Renault Modernizes

(*Continued from page* 26)

desk there is an electric light for each head and each clamping position on the slide. This light signals if there should be a breakdown at any of the points. A single button will stop the entire transfer machine. Under the transfer slide there is a special motor operating a link scraper which collects chips. There is a washing station at the end of each machine, through which the fixture passes before being returned by the conveyor to the loading end of the machine. For cylinder block production, five automatic transfer machines have been installed. The operations on the blocks are as follows:

No.	Operation	Remarks
1.	Mill 5 positioning points.	One special milling machine. Work done in foundry.
2.	Mill upper and lower faces.	One Ingersoll drum-type milling machine.
3.	Mill, bore, chamfer and tap upper and lower faces.	One transfer machine, 4 stations, 7 automatic heads, 170 tools.
4.	Mill generator, starter, gasoline pump breather and belt tensioning pads.	One transfer machine, 2 stations, 4 automatic heads, 8 milling cutters.
5.	Drill crankshaft and camshaft bearings and oil holes; rough bore tappet and cylinder barrel seats.	One transfer machine, 8 stations, 16 automatic heads, 39 tools.
6.	Finish upper and lower faces.	One Circular milling machine.
7.	Drill, bore, chamfer, tap and mill various faces (oil and gasoline pump breather pads, etc.)	One transfer machine, 12 stations, 23 automatic heads, 52 tools.
8.	Finish and chamfer tappet bores.	One special machine, with multiple head, 8 spindles.
9.	Mill lateral faces, main bearings.	One Ingersoll hydraulic milling machine, 8 cutters.
10.	Hydraulic test.	Test for leaks.
11.	Place studs and central bearing.	Manual operation with electric drive.
12.	Finish cut, central bearing.	One special machine, two heads.
13.	Place studs and front and rear bearings.	Same as for operation 11.
14.	Rough bore crankshaft, camshaft and starter bearings.	Two special machines with 2 heads.
15.	Mill front and rear faces.	One Ingersoll Drum type milling machine.
16.	Finish bore crankshaft, camshaft and starter bearing.	Two machines as for operation 14.
17.	Drill, bore, chamfer, tap front and rear faces; finish bore oil pump and tappet holes and cylinder barrel seats.	One transfer machine, 6 stations, 12 automatic heads, 90 tools.
18.	Finish top of cylinder block.	One circular milling machine.
19.	Wash.	One tunnel type automatic machine.
20.	Finish cylinder barrel seats.	One special machine, 1 head, 4 spindles.
21.	Inspect; place protecting plate on top of block; grease; stock.	Manual operations.

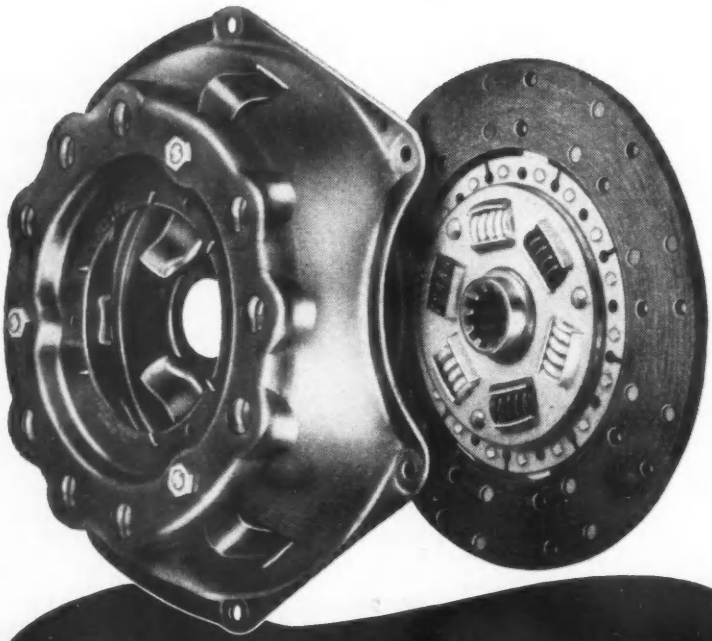
The number of engine units built is 470 No. 1, 230 No. 2, and 30 No. 3 type.

While the cylinder block transfer machines are the most important, with a production of 30 per hr, there are other notable installations. An oil pump housing machine with 12 stations and 19 heads has cut machining operations from 35 minutes to less than four minutes. For machining intake manifolds time has been cut in half. One machine operates on the intake manifold, another on the exhaust manifold, and when bolted together a third machine finishes the two. The labor saving on total machining operations is about 35 per cent compared with that employed for similar parts on earlier models.

In addition to the transfer machines, the following have been installed: 90 special fixed station machines; 55 multiple-head machines with revolving table; 20 machines, revolving table type, with indexing mechanisms. The aluminum cylinder heads are produced on a four-head drilling machine with 42 spindles, 22 of which are nearly one-half in. diam for step by step drilling. While not maintaining that any one type of machine is superior to all others under all circumstances, the Renault engineers are of the opinion that under present conditions the transfer machine offers greater possibilities in the matter of flexibility than all other types.

For crankshaft production, the first of the 24 series of operations are carried out on an 8-station Renault transfer machine having 15 automatic heads and 17 tools. For the succeeding operations use is made of two Wickes Brothers lathes, three Landis grinders, two Cincinnati horizontal milling machines, two LeBlond lathes, two Norton 45 deg grinders, two Norton Crank-O-Matics, five Landis grinders, a Gisholt

(*Turn to page* 62, *please*)



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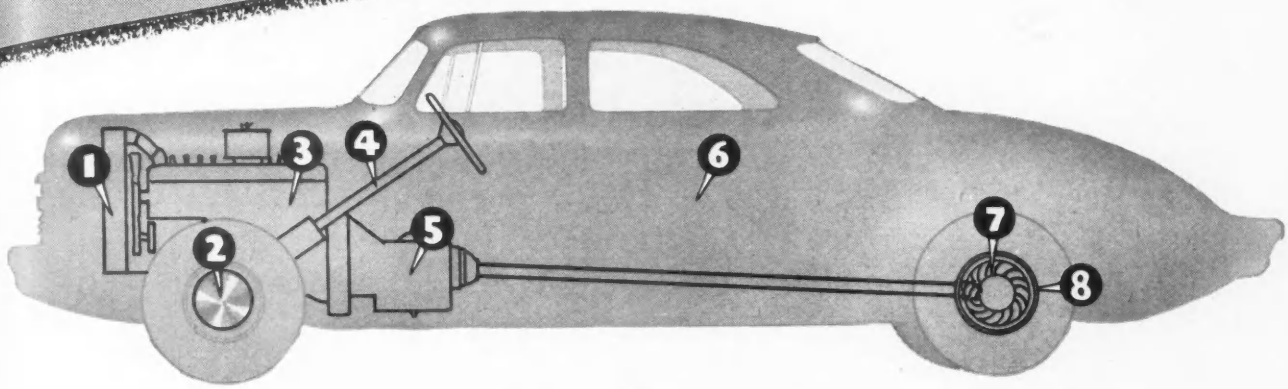
ENGINEERING B-W PRODUCTION

When it's a metal-working problem—ask Houghton!



Where Houghton Products are used:

❶ **FOR DIE CASTINGS:** Houghto-Clean metal cleaners, Mouldlubric die lubricants.

❷ **FOR WHEELS, BUMPERS AND HUB CAPS:** Houghto-Draw drawing compounds, metal cleaners, liquid salt baths.

❸ **FOR ENGINES:** Antisep All-Purpose Cutting Base, Cut-Max cutting oils, for machining parts; Liquid Heats and Draw-Temps for salt bath heat treatment; quenching oils, Cosmoline rust preventives; Hy-Ten Core Oils for casting engine blocks.

❹ **FOR STEERING GEAR PARTS:** Perliton Liquid Carburizer, heat treating salts, cutting and quenching oils, cleaners.

❺ **FOR TRANSMISSIONS:** Cutting oils, cleaners, heat treating salts, liquid or pot-type carburizers, rust preventives.

❻ **FOR BODY WORK:** Drawing compounds, metal cleaners, rust preventives.

❼ **FOR REAR ENDS** (axles and differentials): carburizers, quenching oils, cutting oils, and metal cleaners.

❽ **FOR BRAKES:** Liquid carburizers, quenching oils, cutting oils, metal cleaners.

Yes, automotive plant men have long relied on Houghton for metal processing procedures and materials. In the competitive struggle to make each year's cars better and to keep costs down, Houghton's 84 years of metal-working experience is at your command.

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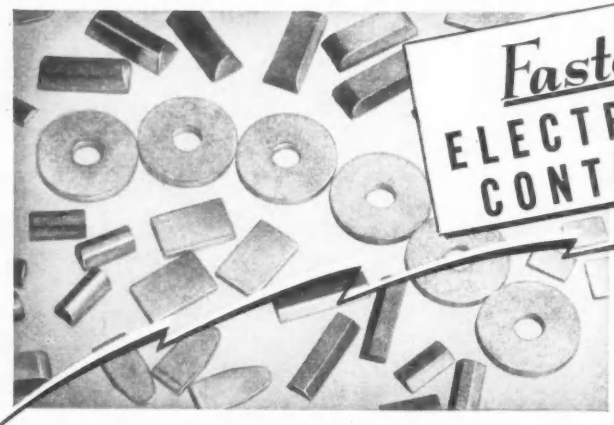

are unequalled for heavy duty service

The high melting points, low arc erosion, non-welding properties, strength and hardness of tungsten or molybdenum are combined with the high conductivity and low contact surface resistance of silver or copper, in FASTELL, trade name of a group of highly specialized electrical contact metals, developed and made only by Fansteel.

Results are a distinct improvement in conductivity, freedom from welding, sticking, pitting or arc erosion.

There are 18 standard FASTELL grades (plus many specials), each developed for its particular service. Our engineers will gladly aid you in selecting the right FASTELL contacts for your product. Fansteel Metallurgical Corporation, North Chicago, Illinois.

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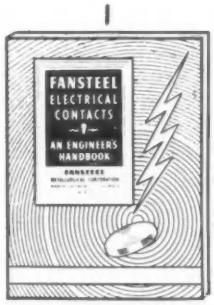
This booklet is a great convenience and handy reference. Write for your copy.



Fansteel
ELECTRICAL CONTACTS
and CONTACT ASSEMBLIES

Dynetric balancing machine and a Norton Crank-O-Lap for lapping operations.

The whole of the machine work on the 4-hp model is carried out in one shop having an area of about 315,000 sq ft. The operations comprise all gear cutting, all machining on cylinder blocks and barrels, cylinder heads, transmission housings, crankshafts, camshafts, connecting rods, pistons, manifolds, shock absorbers, differential housings, and then assembly on two parallel assembly lines, one of the lines handling the engine and the opposite line handling the transmission. From the end of the line the engine, complete with transmission, is picked up by an overhead monorail and carried first into a spraying bay and then into the test shop for running in. A certain percentage is picked out for running under power.

Installation for working sheet metal comprises 14 Clearing presses of 2200 tons, which handle not only the main elements for the rear engine passenger car body, but also other items such as truck cabs. There is an assembly line for the small built-up units, such as doors, scuttle, fenders, and also for the main unit, the platform on which the engine is mounted and to which the body is spot welded. In this section there are four Federal Multi-Spot welders, used for building up the heavy engine-carrying cross member and welding this into the main platform.

The body elements are mounted in jigs and spot welded. Four jigs are available, but two are sufficient for present requirements. At the present time one assembly line is being used for two distinct models, but these are being gradually changed to the one rear-engine job. Upper galleries are made use of for upholstery, fittings, wheels, tires and other components, which are lowered to the final assembly line in conventional manner.

Since the somewhat heavy damage it sustained in war bombing, the foundry has been entirely modernized and is capable of handling 75 to 80 tons of castings per day.

Although State-owned, the Renault factory is operated under the rule governing industrial and commercial organizations. It is administered by a board of diretcors, the president of which is nominated by the Ministry of Industrial Production on the approval of the Ministry of National Economy. Seven of the members of the board are nominated by the government and are men directly interested in the management of the enterprise. Two members represent automobile users and six others represent the staff (two for the engineers, one for the technicians, and three for the workers). When this organization came into being in October 1944, the number of hands had

(Turn to page 64, please)

Protected by

Progress is measured by accomplishment through years of service. The Oliver Corporation has made such progress and its tractors have served well in many fields. Perfect Oil Seals manufactured by Chicago Rawhide protect those tractors against the attack of dust, grit, mud and water and prevent lubricant leakage.

Today, Chicago Rawhide, in its 70th year, congratulates the Oliver Corporation as it begins its second century of accomplishment with a new fleet of quality tractors.

OUR 70TH YEAR OF INDUSTRIAL SERVICE

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OTHER C/R PRODUCTS
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NEW YORK • PHILADELPHIA • DETROIT • LOS ANGELES • CLEVELAND • BOSTON • PITTSBURGH • SAN FRANCISCO • MINNEAPOLIS • CINCINNATI • HOUSTON • DENVER • SYRACUSE • PEORIA

dropped to 13,000. By January 1946 it had been gradually increased to 29,000 and for 12 months has stood at the present figure of 35,000. The proportion of the permanent overhead staff to daily workers is 21 per cent, which is practically equal to 1938, when it was 20 per cent

Canada's Turbojet Test Facilities

(*Continued from page 29*)

organization capable of making all parts of the engine and competent to meet quick changes in design.

There are some 1700 compressor and turbine blades in each engine which have to be manufactured to exremely close tolerances, and in many instances Avro Canada has to develop special equipment to manufacture these blades to the required precision. It has also been necessary to establish special checking equipment for inspecting the parts to the extraordinary tolerances demanded in these engines.

The facilities for carrying out various types of laboratory tests, and for investigating new ideas are comprehensive and complete. In an aerodynamic laboratory, sections of the engine can be checked for airflow patterns by actual air tests, or by electrical analogy. Electronic and vibration equipment are set up for carrying out vibration and fatigue tests on turbine and compressor blades to determine the number of times a blade can vibrate before failing, and to ascertain when and where synchronous vibrations take place. An instrument laboratory is available for developing and calibrating special instruments used in the testing of engines and their components.

The bearings in a jet engine run under exceptionally difficult conditions, and a special laboratory is maintained for running bearings at high speeds and under varying conditions, with suitable equipment for closely watching their performance.

In a mechanical test laboratory, compressor and turbine rotor assemblies can be run at very high speeds to confirm the correctness of the design. The tests are run in a steel-lined pit sunk underground to protect the operators, and allow the bits and pieces to be collected should a blade fail.

An additional laboratory is set up for fuel and oil tests. Mock-ups of the fuel and oil systems are used to simulate actual running conditions, and to check oil and fuel flow. Patternator and fuel burner calibrating rigs are also available to determine types of fuel flow for various kinds of burner nozzles. Situated several hundred yards from the main plant is an engine test laboratory where completed engines are placed on the test stands and run.

In addition to the laboratories at Malton, there is yet another test facility located at Nobel, Ontario. This plant was selected because of its power plant equipment which consists of a 6000-hp steam turbine. This is necessary for compressor testing. A number of large reciprocating air commpressors capable of supplying a substantial quantity of high-pressure air for combustion and aero-dynamic tests are also in operation at Nobel. The facilities are used in the testing and development of the three main components of the engine, namely compressors, turbines, and combustion chambers, and also for carrying out miscellaneous aerodynamic tests on sections of the engines.

for sweet-running motors . . .

Design with

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Thermostats

— in a range of types for every car

Positive motor temperature control — the basic function of Dole Thermostats — is a simple but realistic aid to reputation-winning performance. Dole Thermostats provide quick warm-up *at all seasons* — plus appreciable savings in gas, oil and motor wear.

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Automotive Industries

are Always

Well Informed

Business in Brief

Written by the Guarantee Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES.

Narrow fluctuations in general business activity are indicated. The *New York Times* index for the week ended June 19 stands at 149.2, as against 151.3 for the preceding week and 128.9 a year ago.

Sales of department stores during the week ended June 19, as reported by the Federal Reserve Board, equaled 310 per cent of the 1935-39 average, as compared with 304 in the week before. Sales were 21 per cent above the corresponding distribution a year earlier, as against a preceding similar excess of one per cent. The total in 1948 so far reported is seven per cent greater than the comparable sum in 1947.

Electric power production increased more than seasonally in the week ended June 19. The output was 10.3 per cent above the corresponding amount in 1947, as compared with a similar advance of 9.1 per cent shown for the preceding week.

Railway freight loadings during the same period totaled 906,774 cars, .02 per cent less than the figure for the week before but 0.6 per cent above the corresponding number recorded in 1947.

Crude oil production in the week ended June 19 averaged 5,492,350 bbl daily, a new peak, 12,750 bbl more than the preceding average and 377,850 bbl above the comparable output in 1947.

Production of bituminous coal and lignite during the same period is estimated at 13,410,000 net tons, 4.4 per cent more than the comparable amount a year ago. The total production in 1948 so far reported is 11.1 per cent below the corresponding quantity in 1947.

Civil engineering construction volume reported for the week ended June 24, according to *Engineering News-Record*, is $160,248,000, or 26 per cent more than the preceding weekly figure and 12 per cent above the comparable sum in 1947. The total recorded for 26 weeks of this year is 25 per cent more than the corresponding amount in 1947. Private construction is five per cent above that a year ago, and public construction has increased by 51 per cent.

The wholesale price index of the Bureau of Labor Statistics for the week ended June 19 stands at 165.3 per cent of the 1926 average, as compared with 147.8 a year ago.

Member bank reserve balances decreased $591 million during the week ended June 23. Underlying changes thus reflected include increases of $202 million in Reserve bank credit and $879 million in Treasury deposits with Federal Reserve banks, accompanied by a decline of $16 million in money in circulation.

Total loans and investments of reporting member banks decreased $341 million during the week ended June 9. An increase of $93 million in commercial, industrial and agricultural loans was recorded. The sum of these business loans, $14,245 million shows a net increase of $2491 million in 12 months.

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For Every

SOLDERING OPERATION

Increase your soldering efficiency with Kester Cored Solders. Their dependability and uniformity give you the utmost speed in every type of soldering operation.

There is a Kester "Specialized" Flux-Core Solder in strand size, type of flux, and alloy to fit your needs. Consult our Technical Service Department on any soldering problem.

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Personals

Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.

Ford Motor Co.—**Wilson A. Jones** has been appointed Director of Engineering Industrial Relations. **George Hardesty,** named Director of Production Control, Highland Park plant; **C. B. Ver Duin,** Resident Controller and **A. M. Wilson,** Traffic Manager. **George W. Schultz** is Supt. of the truck and bus chassis division, Highland Park Plant.

Dodge Div., Chrysler Corp.—**E. T. Anderson** has been appointed Supervisor of the special equipment department of the Truck Div.

Studebaker Corp.—**William E. Fitzgerald** has been named Truck Sales Promotion Manager.

Willys-Overland Motors — **William J. Wade** has been appointed Asst. to the Executive Vice-president. **Joseph E. Consolmagno** has been made Chief of the Press Section.

The White Motor Co.—**William B. Terbeek** appointed Works Manager.

Fruehauf Trailer Co. of Canada, Ltd.—**R. T. Hazell** has been promoted to the post of General Manager.

AC Spark Plug Co.—**John C. Hines** has been appointed Sales Manager.

Auto-Lite Battery Corp.—**Charles Popper** appointed Service Manager of the Company.

The Parker Appliance Co.—**Charles E. Cleminshaw** appointed Chief Industrial Engineer.

General Motors Corp., Harrison Radiator Div.—**Douglas B. Whitney** has been made General Manager.

Bendix-Westinghouse Automotive Air Brake Co.—**Howard J. Begin** has been made Advertising Manager.

Sealed Power Corp.—**Paul C. Johnson** was named Executive Vice President to succeed **Neil A. Moore,** resigned. **R. R. Beardsley** has been appointed Vice-President and Secretary, **L. G. Matthews,** Treasurer.

Reynolds Metals Co.—**M. A. Sievert** appointed engineer in the Technical Service Dept.

National Carbide Corp.—**J. Carl Bode** elected President.

Toledo Steel Products Co.—**Robert Schoonover** has been appointed Advertising Manager.

Sealed Power Corp.—**George W. Davies** has been appointed General Sales Manager.

Bakelite Corp.—**John J. Benedito** has been made Manager of the newly created Extrusion and Molding Materials Division, Thermoplastics Dept.

Eaton Mfg. Co., Stamping Div.—**R. E. Fisher,** promoted to General Manager.

General Electric Co.—**R. I. Parker** elected a commercial Vice-President. **George Alexander** appointed assistant to the manager of the Laminated plastics plant in Coshocton, Ohio. **Edward G. Gray** is works engineer of the plant.

The Cleveland Graphite Bronze Co.—**Charles A. Williams** has been made Asst. to the Vice-President of Sales, **L. W. Christenson.**

Jack & Heintz Precision Industries, Inc.—**J. Louis Reynolds,** Manager of the Aviation Division has been elected Vice-President.

Raybestos-Manhattan, Inc. — **John H. Matthews,** Vice-President and Director of the company was elected to the Board of Directors of The Canadian Raybestos Co., Ltd.

Luscombe Airplane Corp.—**Sydney Carter** has been named Advertising and Public Relations Manager.

Jack & Heintz Precision Industries, Inc.—**Frank R. Kohnstamm** elected Vice-President.

The Elastic Stop Nut Corp.—**D. E. Lally** has been made Asst. General Sales Manager.

The Glidden Co.—The following technical service directors have been appointed: **C. O. Hutchinson,** Chicago; **Charles M. Dunn,** Cleveland; **Howard P. Wertman,** Reading, Pa.; **R. R. Abernathy,** San Francisco.

National Motor Bearing Co.—**Park Q. Wray, Sr.,** has been made a director of the company.

F. L. Jacobs Co.—**Fred L. Jacobs,** Vice-President, has been elected a Director of the company.

Exclusive NEW
FOUR UNIT FASCO SNAP-MOUNT
CIRCUIT BREAKER *Now Available*

● Now automobile headlights, windshield wiper, horn, heater and other electric equipment can be wired to one circuit breaker assembly, saving valuable assembly time and money. It's the dimples in the mount and circuit breaker case (shown in the magnified view) that give the snap action and speed up production. Circuit breakers snap into the mount securely and quickly, *by finger pressure.* No spot welding. No screws. No tools needed. *And,* if desired the mount can be attached to the car body . . . the circuit breakers assembled on the wiring harness, and snapped into the mount when the car is wired. Engineered and made to last the life of the car. Write for further information, or phone our Detroit office, 6432 Cass Avenue, Detroit 2, Michigan. Phone Madison 6300.

FASCO
CIRCUIT BREAKERS

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Safeguard Operation of Automotive Electrical Equipment Instantly . . . Automatically . . . from Dangerous Overloads or Short Circuits.

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Electrical Engineering and Manufacturing Serving the Automotive Field for 26 Years

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SLEEVE TYPE BEARINGS

Quick DELIVERY

Any Type... Any Size... Any Quantity

● It is no longer necessary to put up with delays in securing Sleeve Bearings. Simply get in touch with Johnson Bronze. Regardless of the type you require . . . cast bronze, babbitt and bronze, steel and babbitt, steel and bronze, rolled sheet bronze, powder metallurgy or aluminum alloy . . . we can give you prompt, efficient service. If your requirements are standard stock sizes, we can ship your order the same day it is received.

When you are not sure which type will best serve your needs, consult with our engineers. We will gladly study your requirements from every angle and give you an unbiased, authoritative report without obligation. All of our recommendations will be based on facts supported by more than forty years exclusive bearing experience. Remember, when you need Sleeve Bearings come to Johnson Bronze first! You cannot buy finer bearings at any price . . . or any quicker.

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The MOST COMPLETE SLEEVE BEARING SERVICE in the WORLD

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PLAN *Silent* CAT-QUIET OPERATION IN EVERY BASIC DESIGN

You've often remarked that no piece of equipment can be superior to its component parts...

You appreciate the broad recognition and acceptance of BCA Ball Bearings in industry . . .

You know you can tell your engineers to draw upon our half-century of experience in friction control practices, encompassing many varied fields of industry . . .

You, who insist upon continuous, full-capacity, trouble-free operation, know this can be assured by specifying BCA Ball Bearings.

BEARINGS COMPANY OF AMERICA
LANCASTER, PENNSYLVANIA

BCA RADIAL • ANGULAR CONTACT • THRUST BALL BEARINGS

Publications Available

(*Continued from page* 58)

solvent cleaner, is described in an interesting article which appeared in a recent issue of Oakite News Service.

L-25—Die Casting Machines

The Cleveland Automatic Machine Co.—Model 200 Die Casting Machine is described in a new bulletin which pictures the machine, gives general specifications special features and applications.

L-26—Hydromatic Propellers

Hamilton Standard Propellers, Div. United Aircraft Corp.—A new booklet, describing in simple terms the operation of the reversible Hydromatic propeller, is available. It is intended primarily for pilots of multi-engined aircraft, technical schools and aviation trade executives. It is profusely illustrated with cartoons and operating diagrams. It also discusses in detail the operation of such accessories as the automatic synchronizer and electric de-icing.

L-27—Abrasive Cutting Machine

Andrew C. Campbell Div., American Chain & Cable Co.—A new 4-page catalog features the new Model 223 Bar Cutter. Featured in the catalog are pictures of the machine, both interior and exterior and close-ups of the cutting section. A complete breakdown of each part of the machine, specifications and details are included.

L-28—Sanders

Sterling Tool Co.—A new 8-page brochure, covering the applications and operation of the Sterling Portable Electric Sander and the Sterling Speed-Bloc Portable Air-Driven Sander, has been issued. Included in the brochure is detailed information on the complete Sanding Kits; illustrations and prices of the various accessories and a listing of the 17 Sterling Sander service depots in the country and Canada.

L-29—Ni-Hard Castings

The International Nickel Co., Inc. —A revised, 8-page booklet, with abrasion problem questionnaire, presents the facilities, specialties and locations of authorized producers of Ni-Hard, a nickel-chromium white alloy cast iron.

STILL BUILDING SALES FOR YOUR CARS after more than

70,000,000 INSTALLATIONS!

the Bendix STARTER Drive

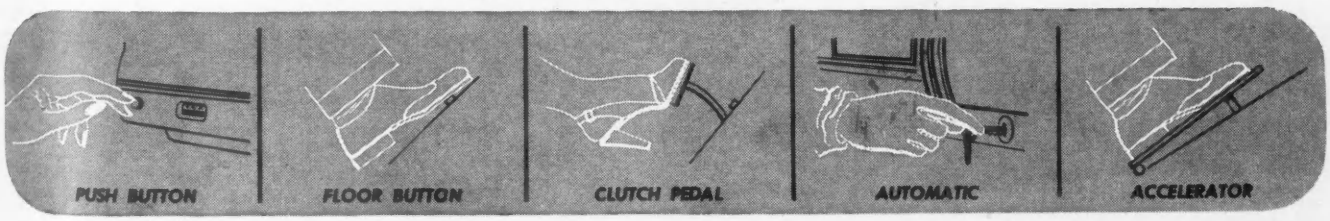
NO MATTER WHAT TYPE OF STARTING YOU SELECT—YOU CAN *DO IT BETTER—DO IT FOR LESS* WITH BENDIX DRIVE

Few automotive products of any kind have such an enviable record of near-universal use as the Bendix* Starter Drive. Its reliability and versatility have made it the choice for over 70,000,000 installations, and a great many manufacturers have specified it year after year after year.

Another important reason for this leadership is that, once the type of starting has been determined, it can be accomplished at a lower cost with the Bendix Starter Drive than any other way. It will pay you well to look into these advantages. Your inquiries are invited.

*REG. U.S. PAT. OFF.

SPECIALISTS IN ALL TYPES OF STARTING



ECLIPSE MACHINE DIVISION of ELMIRA, N.Y.

Detroit Office: 8-212 General Motors Bldg.

Bendix AVIATION CORPORATION

New Diamond T Trucks

(*Continued from page* 31)

and 614SBD1055 are of larger size owing to the optional axle equipment. The hand brake is of conventional drum type on all models except 614SBD1055 where the 12-in. Tru-Stop brake is employed.

The standard rear axle on the 614 is of full-floating, hypoid bevel type with ratio of 7.4 to 1. An optional two-speed axle of full-floating, double reduction type is offered, with ratios of 6.32 and 8.22 to 1, the shift being effected by vacuum power.

The Model 614H is fitted with a heavy duty, two-speed axle of full-floating spiral bevel type. It is available in two combinations of ratios—5.57 to 1 with 7.59 to 1; and 6.5 to 1 with 8.86 to 1. Speed change is effected by vacuum power.

Model 614SBD1055 has dual drive tandem rear axles driven through a torque divider at the rear of the transmission, the axles being of full-floating, spiral bevel gear drive with steel housings. Axle ratios are 6.16 and 7.25 to 1, drive being through individual shafts from the torque divider which provides an additional reduction of 1.22 for the standard single-speed model; and a choice of 1.04 or 1.68 reduction with an optional two-speed torque divider. Torque dividers feature Timken High-Traction gears which compensate for unequal traction. The optional two-speed torque divider offered in this model has provision for differential lock-out in the low speed range.

A heavy duty, five-speed transmission with direct in fifth is standard equipment on all 614 models; an optional five-speed overdrive transmission also is available.

Models 614 and 614H have a two-piece propeller shaft drive with three needle-bearing joints, in combination with an intermediate support carried in a rubber block mounted under compression. Softer low-rate front springs are supplied on all 614's used as tractors, to improve the ride.

The deluxe safety steel cab on the 614's is 60 in. in width, and has vee-type twin windshields fitted with safety plate glass, individually controlled. Seat cushions have a pad of rubberized curled hair over steel spring, cushions and seat backs being covered with plastic upholstery material. A deluxe sleeper cab similar to the deluxe cab offers an extra adjustable window on each side.

The Model 704 has a dual range rear axle—Eaton 18501—of heavy duty, full floating, two-speed type with air shift. Ratios: 5.14 to 1 with 7.02 to 1; and 5.57 to 1 with 7.59 to 1. As optional equipment Diamond T offers the Timken R-200 and R-300 single-speed and two-speed double-reduction axles with hypoid bevel gear drive in first reduction. The two-speed axle has air shift. Ratios: R-200—7.08 and 7.84 to 1; R300—7.12 to 1 with 8.53 to 1.

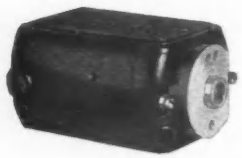
Model 704H has a standard full-floating, two-speed axle—Eaton 20,-500—having a planetary gear second reduction for low speed range, with air operated shift. Axle ratios: 5.43 with 7.39 to 1; 6.14 with 8.36 to 1; and 6.71 with 9.13 to 1. Optional axle equipment on this model consists of Timken U-200 and U-300 single-speed and two-speed double-reduction axles of full-floating type. The two speed U-300 has air shift. Ratios: U-200—7.08 to 1 and 7.84 to 1; U-300—7.12 to 1 with 8.53 to 1.

Six-wheeler models in this series are available with the Timken SBD1555P dual drive tandem axles of full-floating spiral bevel type, used in combination with the Timken Model T70, two-speed torque divider. Axle ratios are—6.83 and 7.8 to 1, the torque divider providing a choice of additional reductions of 1.04 and 1.68 to 1. Additional equipment for six-wheelers consists of heavier Timken dual drive tandem axles built as a single driving unit with eight parallel torque rods to both axles. The

(*Turn to page* 76, *please*)

synonymous with craftsmanship...

Lamb Electric MOTORS



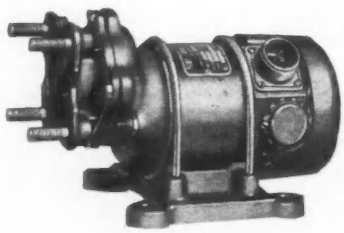
A compact motor, particularly suitable for computing machines and other types of motor-driven office equipment.

This small sturdy motor can be readily adapted to a wide range of industrial application.

● Special engineering to provide the exact electrical and mechanical characteristics ... precision manufacturing ... rigid testing — these comprise the craftsmanship that assures superior performance and dependability in Lamb Electric Motors.

Because of this high standard of performance, Lamb Electric Motors are powering more and more of America's finest products.

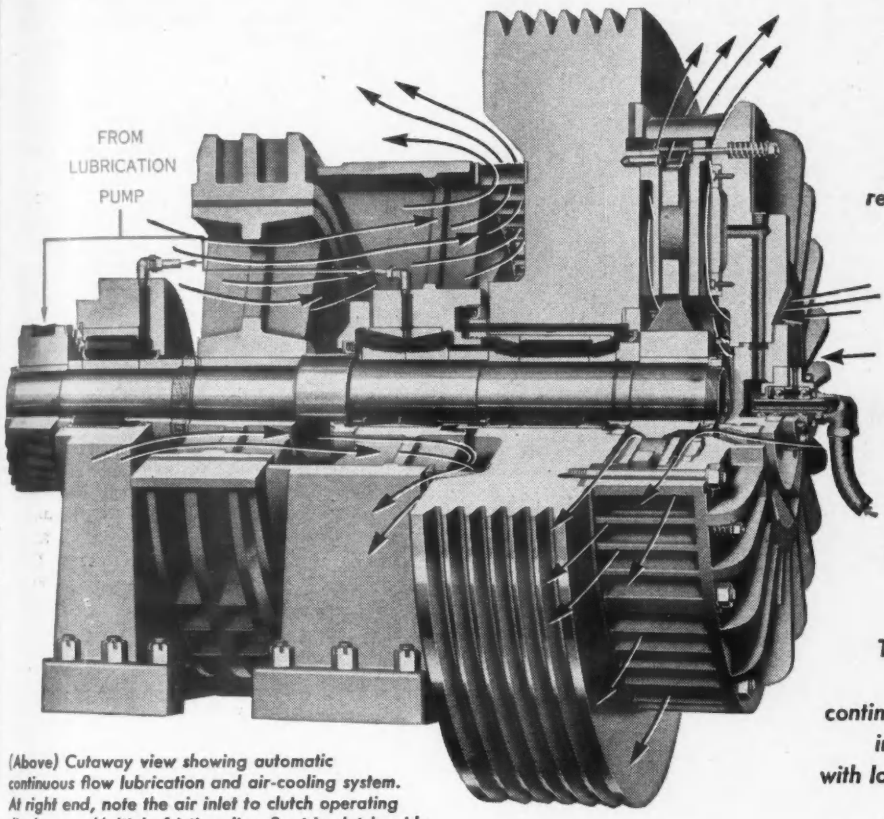
THE LAMB ELECTRIC COMPANY
KENT, OHIO



Base-mounted, explosion-proof aircraft geared fuel transfer pump motor.

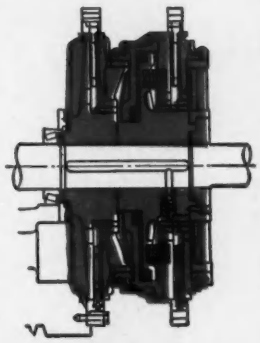
Lamb Electric SPECIAL APPLICATION FRACTIONAL HORSEPOWER MOTORS

PRESS CLUTCH ENGAGEMENTS
. *under load* with negligible wear



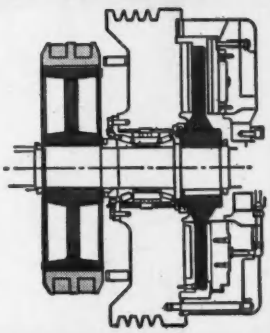
(Above) Cutaway view showing automatic continuous flow lubrication and air-cooling system. At right end, note the air inlet to clutch operating diaphragm. Multiple friction discs float in clutch spider when disengaged. Brake shoes in drum at left are spring-engaged and air-released automatically.

Cross sectional outline of conventional clutch shows relative proportion of components subject to acceleration (indicated in red).



conventional type press clutch

Note the smaller mass of accelerated components in the Danly Clutch. The larger mass (not shown in color) in continuous rotation results in easier acceleration with lower starting torque.



new Ventilated Danly Clutch

Danly Press and Clutch Features Reduce Press Down-Time

Construction features of the Danly Clutch offer specific reasons why Danly Presses cost less to operate and produce more stampings over a given period.

★ **Long Life of Friction Discs** is assured because of the low starting torque of Danly Clutches. Low-energy clutching characteristics have been achieved by a new design which requires less than one-fifth the mass in clutch components subject to acceleration, as compared to conventional press clutches.

★ **Cool Operation** further reduces wear of friction discs and provides protection of the antifriction bearings from overheating. The clutch housing itself is a cooling fan which provides high velocity ventilation through internal ports adjacent to areas where heat is generated.

★ **Automatic Pressure Lubrication** circulates clean, filtered oil to each bearing *including the flywheel bearings.* There are no grease fittings requiring periodic attention of the operator.

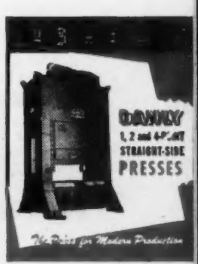
★ **Instant Pushbutton Activation** is produced by compressed air controlled by an electric solenoid valve.

★ **Simple Disassembly** permits inspection of parts subject to wear. This can be done in only a few minutes. It is unnecessary to dismantle entire clutch to make infrequent replacements of worn parts.

DANLY MACHINE SPECIALTIES, INC.
2100 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS

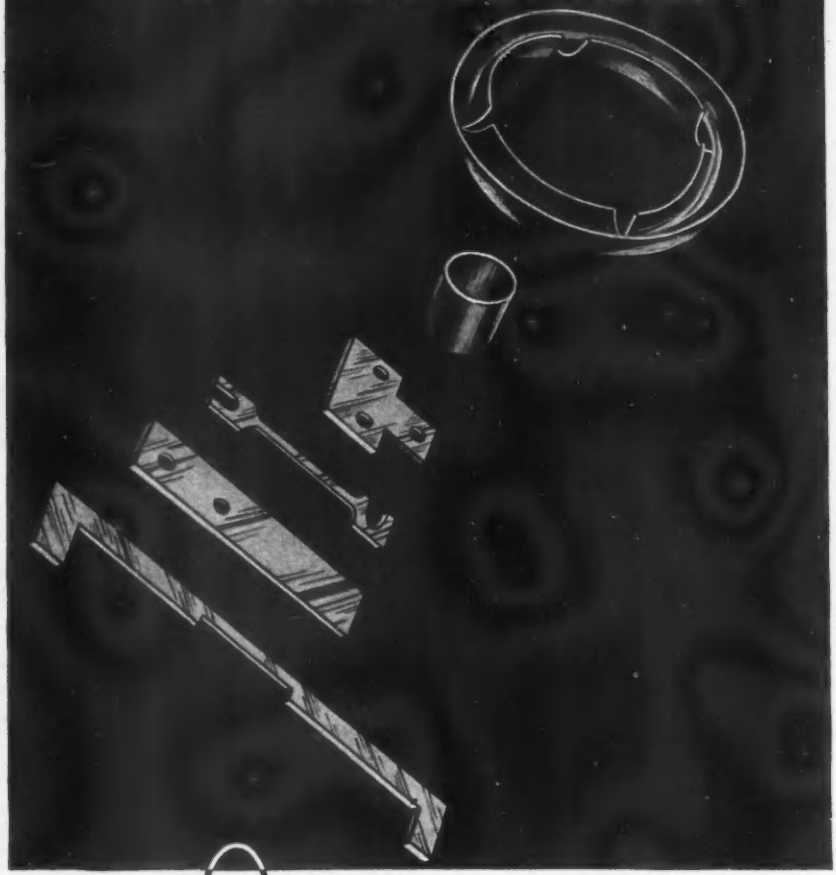
free **get this catalog**

Write TODAY for valuable literature illustrating and explaining features of and suggesting profitable uses for Danly Presses. Standard Press Models available from 50 to 1,500 tons.



STAMPINGS

IN ANY QUANTITY CUT
TO YOUR SPECIFICATIONS



OUR EXPERIENCE, precision machines, materials and methods enable us to offer accurately produced stampings in any quantity, cut to your tolerances.

●

Send sketches, blueprints, or samples, and let us quote according to production methods eliminating wasted material and time.

3036

LAMINATED SHIM COMPANY
INCORPORATED
GLENBROOK, CONNECTICUT

Timken SW3010PA axle is of worm-drive type with ratios of 6.8 and 7.25 to 1; the Timken SD3010PA axle is of double-reduction type with a ratio of 7.5 to 1.

Brakes on the 704's are full air Westinghouse type with ¾-in. linings at the rear and ⅜-in. at the front with Westinghouse slack adjusters at the rear and Timken at the front. A limiting valve is supplied for reducing pressure on front brakes. The hand brake is the heavy-duty Tru-Stop 16-in. type.

Standard equipment on the 704's offers the choice of a five-speed transmission with direct in fifth or a five-speed overdrive at no extra cost. A three-speed auxiliary providing underdrive and overdrive is available in conventional models at extra cost—only for wheelbases 154¾ in. and longer. It is not approved when the overdrive transmission is specified.

Conventional 704 models have 9.00-20-12-ply rayon cord tires standard, with duals rear. Optional tires include—10.00-20 and 11.00-20 for all axle combinations. Other combinations also are offered in certain cases. On 614 and 614H models, standard tires are 7.50-20-8-ply, with duals rear. Options include 8.25, 9.00, and 10.00-20, all with duals rear. On 614BD1055 models, standard tires are 8.25-20-10-ply with duals at the rear; 9.00-20-10-ply being optional.

A deluxe cab, special equipment on the 704's, is of full three-man size with an overall width of 64¼ in. Air-operated windshield wipers are standard equipment on this cab. A sleeper cab of similar design and features is available.

British Sport Car of Unusual Design

(*Continued from page* 41)

engine for this new Aston Martin is a four-cylinder overhead-valve type with a 3.25 in. bore, 3.62 in. stroke and 120 cu in. displacement. Its features include a five-bearing balanced crankshaft, full-pressure lubrication, and light alloy pistons with four piston rings. Two carburetors are used.

Argentina Makes Deal with Italian Car Maker

(*Continued from page* 27)

tional Economic Council, and until that organization issues a report, no official information will be released, according to government officials.

Steering AT ITS BEST

NEW GREYHOUND HIGHWAY TRAVELER

ROSS BRINGS EASE . . . AND ECONOMY

GREYHOUND'S NEW SUPERCOACH, known as "The Highway Traveler," is distinguished for its performance and is highly distinctive in appearance. Among its many other outstanding advantages, is the good steering supplied by Ross . . . whatever the steering job may be . . . light or heavy . . . Ross assures the utmost in performance, economy and satisfaction.

Experience gained through the use of Ross steering gears on military vehicles during world war II has led to current improvements in Ross design, resulting in:

(1) *Increased mechanical reduction* . . . (2) *More compactness of design* . . . (3) *Reduction in weight* . . . (4) *Greater arm angular-travel* . . . (5) *Improved metallurgy* . . . (6) *Increased efficiency.*

Throughout 41 years of leadership in this industry, Ross gears have been distinguished for long life, simplicity of adjustment and maintenance of long-recognized qualities of safety, stability and performance. We invite discussion of any steering problem.

Ross

Cam & Lever **STEERING**

ROSS GEAR AND TOOL COMPANY • LAFAYETTE, INDIANA

Flexible Transfer Machines

(*Continued from page* 36)

Station 1—Load
Station 2—Drill 32 holes
Station 3—41 spindles, counterboring and chamfering spark plug holes, drilling, reaming and chamfering other holes
Station 4—Idle
Station 5—Drill and ream 15 holes
Station 6—Chamfer seven holes
Station 7—Idle
Station 8—Tap 19 holes, including 8 spark plug holes
Station 9—Unload

The arrangement for cylinder block machining is necessarily a great deal more extensive, involves a variety of over several hundred operations. The present set-up includes, in the main, advanced types of individual transfer machines each one having an automatic cycle within its area of operation. Among the new items of equipment are: Footburt transfer machines of different types; Ingersoll transfer machines — multiple-section milling machines of several types; a large cam-and-crank boring machine; and several new Power-Pack units. Interspersed among these transfer machines are some older machines used on previous models and other process equipment to be noted below.

As usual, the production department has been making changes and improvements as they gain experience with this aggregation of mass production equipment. One of the most simple but effective devices introduced recently is the arrangement for blow-off of chips and turnings at certain of the idle fixture stations between machines. By the very nature of things this makes it possible to handle an essential operation without cost either in labor or time.

One of the larger transfer machines on the cylinder block lines is the Footburt 17-station horizontal drilling unit for drilling, chamfering and tapping all holes in the front and rear ends of the block. Here the first station is for loading, the 17th for unloading, while stations 6, 11, and 14 are idle. It is arranged with four major working fixtures spanning the following stations—1 to 5, 6 to 10, 11 to 13, 14 to 17. It will be noted that the first station of each group corresponds to the idle stations mentioned earlier, while No. 17 is for unloading.

This machine, in common with the transfer unit on the cylinder head line and the other Footburt transfer machines, is completely automatic in cycle, operated from a control cabinet, and features the tell-tale control light panel described earlier.

This machine is of two-way horizontal type with the block fed through longitudinally, with right hand heads drilling the front end, while left hand heads take the rear end. Starting with station 2 and continuing through station 5, the two 9/16-in. oil gallery holes are drilled progressively deeper at each station to distribute the drilling load and assure a true, straight hole. Station 5 is idle. This operation is continued at station 6 and through station 10. At the latter, the right hand head reams one hole and countersinks the other while the left hand head completes the gallery holes through. Station 11 is idle.

The remaining stations handle miscellaneous holes in both ends as follows:

Station	Operation
12	RH head—21 holes LH head—11 holes
13	RH head—countersink and tap 10 holes
14	Idle
15	RH head—tap 25 holes LH head—tap 6 holes
16	RH head—tap one hole LH head—tap two holes
17	Unload

Among the Ingersoll Power Pack transfer type drilling machines, we have selected a 6-station unit for brief comment. The cycle of events in this machine is as follows:

Station	Operation
1	Drill 5 oil holes part way through Drill 5 angular oil holes
2	Drill 5 oil lead holes
3	Drill oil pump hole, oil suction hole and distributor hole

(*Turn to page* 82, *please*)

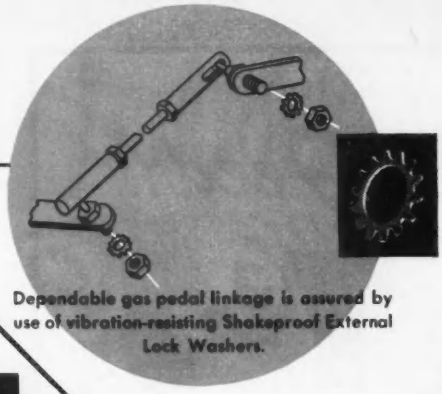
Specifying springs and wireforms for exacting applications very often is a feverish task. In a substantial number of spring-buying plants specifications and purchases are made for springs that habitually include "fancy" and expensive design characteristics such as close tolerances, ground-ends, fancy hooks, etc. In many, many cases equally efficient but more economical springs could be used to do the job just as well.

By calling in a specialist—the Lewis Spring Engineer—to diagnose the conditions and requirements of your spring applications, it is possible to eliminate costly specifications that are not absolutely necessary because Lewis Spring Engineers are thoroughly familiar with all phases of spring design and applicability to products. Time after time they have saved manufacturers thousands of dollars by recommending and supplying the most practical, economical springs and wireforms for the jobs to be done.

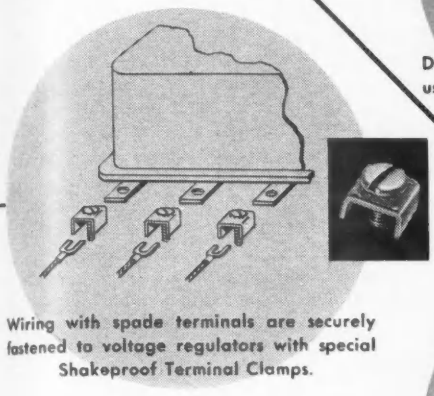
To lower the unit cost of your products without lowering product quality, have a Lewis Spring Engineer give your products a spring checkup. There's no obligation—and it may be surprising the savings he can make for you.

LEWIS SPRING & MANUFACTURING COMPANY
2644 WEST NORTH AVENUE CHICAGO 47, ILLINOIS

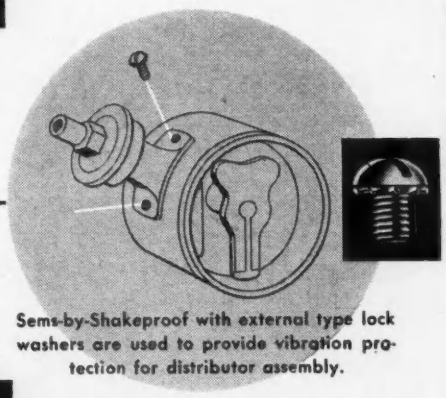
Lewis PRECISION SPRINGS
THE FINEST LIGHT SPRINGS AND WIREFORMS OF EVERY TYPE AND MATERIAL



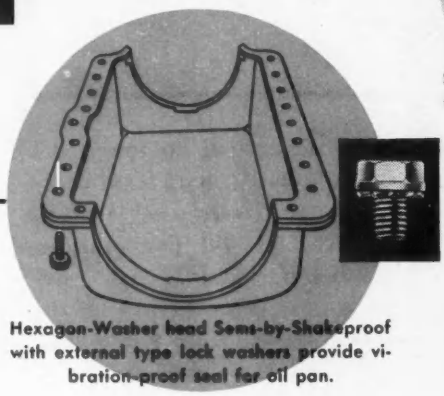
Dependable gas pedal linkage is assured by use of vibration-resisting Shakeproof External Lock Washers.



Wiring with spade terminals are securely fastened to voltage regulators with special Shakeproof Terminal Clamps.



Sems-by-Shakeproof with external type lock washers are used to provide vibration protection for distributor assembly.



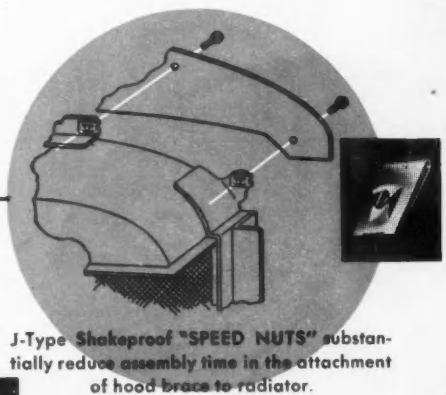
Hexagon-Washer head Sems-by-Shakeproof with external type lock washers provide vibration-proof seal for oil pan.

SHAKEPROOF inc.

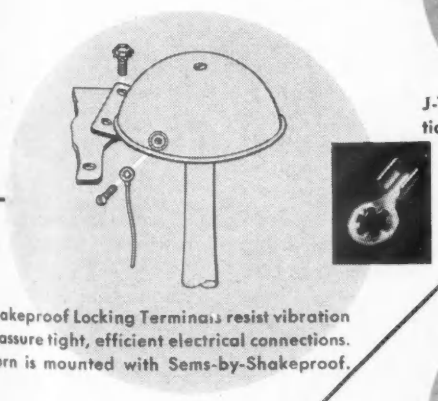
fastening headquarters

DIVISION OF ILLINOIS TOOL WORKS
2501 NORTH KEELER AVENUE
CHICAGO 39, ILLINOIS

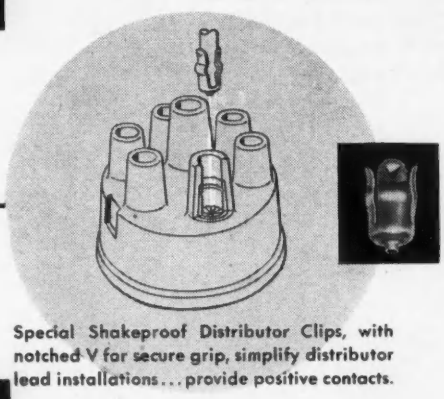
WRITE FOR SAMPLES...



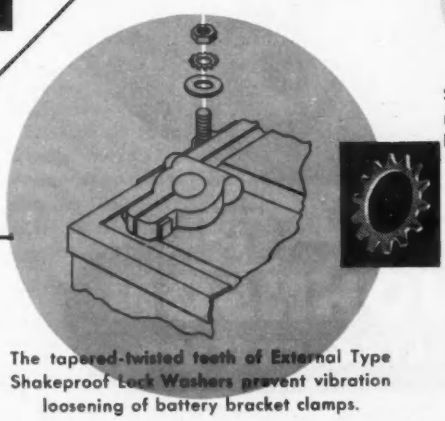
J-Type Shakeproof "SPEED NUTS" substantially reduce assembly time in the attachment of hood brace to radiator.



Shakeproof Locking Terminals resist vibration to assure tight, efficient electrical connections. Horn is mounted with Sems-by-Shakeproof.



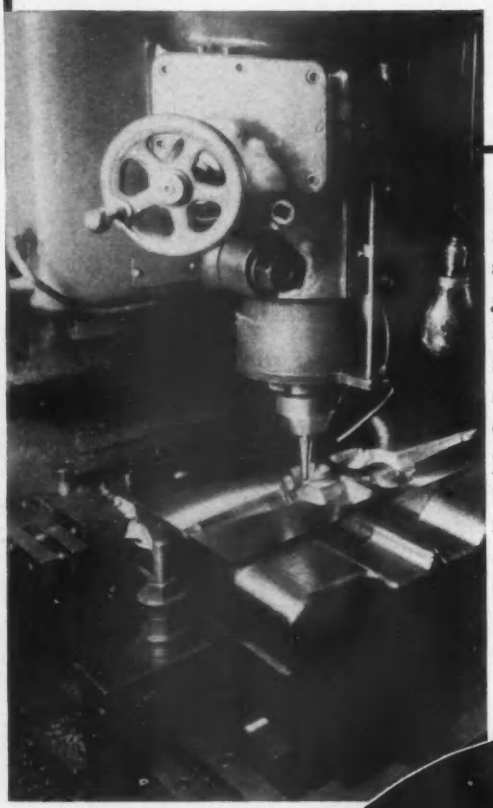
Special Shakeproof Distributor Clips, with notched V for secure grip, simplify distributor lead installations... provide positive contacts.



The tapered-twisted teeth of External Type Shakeproof Lock Washers prevent vibration loosening of battery bracket clamps.

Raise the Feed!

CUT COSTS WITH T-J CUTTERS



Do your cutting in tough die steels *faster* . . . with less breakage . . . and *more work between grinds!* Use T-J Die Sinking Milling Cutters! They're designed for accuracy and sturdiness . . . made from a standard, extremely high grade steel . . . properly machined . . . scientifically heat-treated and accurately ground. Many styles and sizes . . . proved on countless tough jobs! Send for new catalog. The Tomkins-Johnson Co., Jackson, Michigan.

A T-J Cutter at work on a drop hammer die block for steering knuckles. The material is molybdenum die steel of C45-C50 Rockwell.

FOR TOUGH JOBS SPECIFY T-J

TOMKINS-JOHNSON

DIE SINKING MILLING CUTTERS

4	Bore distributor and oil pump hole, tap oil pump suction hole
5	Countersink 5 oil lead holes
6	Tap 5 oil lead holes

Here and there will be found features of machine design of exceptional merit, one example being the Ingersoll for milling miscellaneous pads. The transfer type fixture has one working station but accommodates three blocks at a time—one loading, one working, one unloading. Unique feature of the arrangement is that, while cutting, the entire machine head moves sidewise carrying the transfer fixture with it. By this means the unloaded head which has been moved out of the working position is carried forward to bridge the gap in the gravity roller conveyor to the next machine, and is in position to be slid directly onto the conveyor when the cutting operation has been completed. This gives the operator ample time to load one end and move a finished block on the conveyor to the next operation without loss of time or manual effort.

Packard is particularly proud of the Footburt transfer unit for handling the intricate operations of finishing the entire valve line—intake and exhaust valve throats, valve face clearance, valve guide and tappet holes—in a single pass through this automatic machine. The machine has seven multiple-spindle units tied together to form a transfer line of 12 stations. The spindle heads on each of the seven units are inclined to the vertical axis owing to the angularity between the axis of the valves and the axis of the cylinder bores.

Of the 12 stations that make up the transfer unit, seven are working stations, the others being arranged for loading, unloading, and idle, as outlined below.

Station	Operation
1	Load
2	Core drill eight intake throats and eight exhaust throats
3	Spot face four intake and four exhaust angular valve clearance
4	Idle
5	Spot face remaining four intake and four exhaust angular valve clearance
6	Drill 16 valve guide holes and one water circulating hole
7	Idle
8	Drill 16 valve tappet holes
9	Rough line ream 16 valve guide holes and 16 valve tappet holes
10	Idle
11	Finish ream 16 valve guide holes and 16 valve tappet holes
12	Unload

Readers of
Automotive Industries
are Always
Well Informed

Which is really Loretta Young?

Starring in RKO RADIO'S "Rachel and the Stranger" (See answer below)

Spark plugs also look alike, but

AUTO-LITE SPARK PLUGS

are "Ignition Engineered"

THESE photographs of Loretta Young and her "Look-Alike" may confuse you in selecting this year's Academy Award Winner. You also may find it difficult to pick the best spark plug from *outside appearance*. But no matter how much spark plugs look alike, here's a simple way to get the best *every time*. Ask for ignition engineered Auto-Lite Spark Plugs—designed by the same engineers who design the entire electrical life-line for many of America's finest cars and trucks—from generator to battery to distributor to ignition system.

If you picked the girl at the left as the real Loretta Young, talented actress soon to be seen in RKO Radio's new thriller "Rachel and the Stranger," score yourself 100%. Her double is Ellen Brooks of Nagle Avenue, New York, who enjoys being mistaken for the glamorous Miss Young. You'll be 100% right, too, when you switch to Auto-Lite Spark Plugs, original factory equipment on many leading makes of cars.

Switch to AUTO-LITE

MONEY CANNOT BUY A BETTER SPARK PLUG

AUTO-LITE MEANS PRECISION MANUFACTURING

Toronto, Ontario — THE ELECTRIC AUTO-LITE COMPANY — Toledo 1, Ohio

Tune in the Auto-Lite Radio Show "Suspense," the greatest Mystery Drama of our Time. Thursdays 9:00 P.M., E. T. on CBS

New Device Measures Strain in Rubber

A new device developed at the National Bureau of Standards conveniently measures strain in vulcanized rubber, in contrast to the conventional tensile testers which determine tensile stress. In this apparatus the strain is measured at a definite time after application of a predetermined stress, while the usual testing method employs essentially the opposite procedure, that is, measurement of stress at a specified strain.

The tester is composed of two parts, built into a supporting table. One part, above the table, includes a mechanism for extending the specimen, an optical system for observing the upper bench mark on the specimen from a seated position, a mechanism for aligning a millimeter tape with the bench marks, a time cycle controller for regulating the sequence of operations, and a keyboard for selecting the load to be applied to the specimen. Beneath the table is the mechanism for applying the selected load. This mechanism employs eight solenoids for adding eight different weights singly or in combinations to a weight assembly attached to the specimen.

The rubber specimens are strips 0.254 in. wide and six in. long, cut from the usual six-inch square test sheet. The bench marks, placed on the specimens in the usual manner, are spaced 10 cm apart. Using a special thickness gage, the average thickness of the specimen between the bench marks is obtained by a single measurement. The gage reading is entered on the keyboard of the strain tester.

Lagonda Production to Be Started Soon

Production is about to begin of the Lagonda car, as designed by W. O. Bentley. When the Lagonda company went into liquidation, the assets were purchased by the David Brown Tractor Group, which combined operations with Aston Martin, and made arrangements for the car to be built in that firm's factory at Feltham, near London.

Chromic Acid Shortages Due to Maldistribution

Shortages of chromic acid and sodium bichromate are due primarily to domestic maldistribution and cannot properly be eliminated by government allocation or reduced export quotas, the Commerce Department in Washington has decided. The department's Office of International Trade notes that current shortages of these two commodities are in the metal finishing industry. Normally, this industry accounts for about 85 per cent of domestic consumption.

Officials of OIT and the affected industry decided at an industry advisory meeting recently that current export quotas for chrome chemicals "are not unduly high, and do not seriously affect the domestic consumer."

OIT said that over-ordering by many firms, for resale at high prices, was a primary cause of the tight supply situation. The agency pointed out that both industry and government members of the advisory committee are unanimous in feeling that government allocation would not provide a desirable solution to the distribution problem. Better distribution practices, OIT stated, must come from the trade itself.

Chevrolet Trucks

(*Continued from page* 37)

users whose loads are heavy or who operate in extremely hilly areas. The Model 3742 is nominally rated at ¾ ton.

Model 3942 carries a nominal rating of one ton. The wheelbase is 137 in. to accommodate bodies with load space up to 11 ft in length and 420

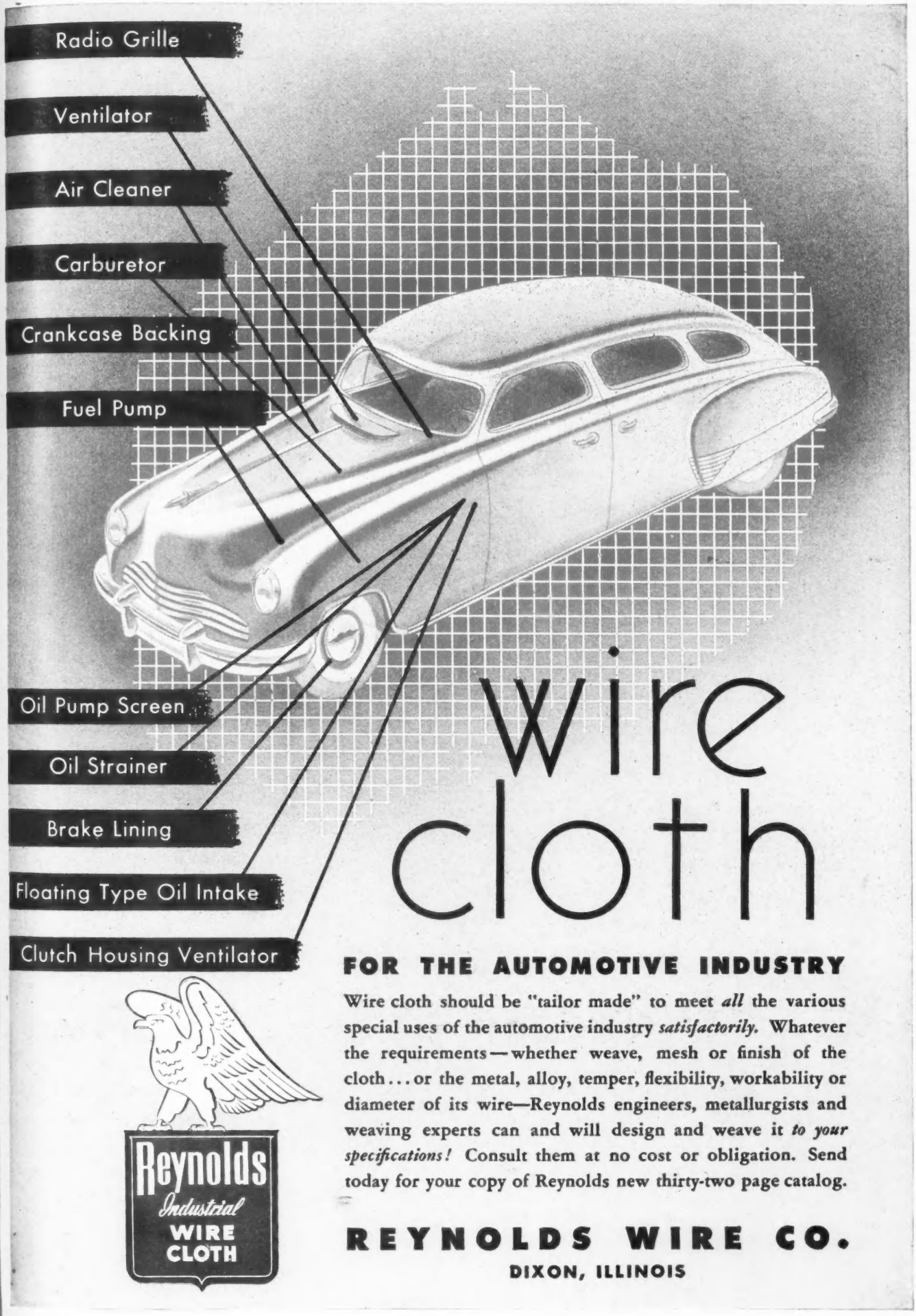
(*Turn to page* 86, *please*)

Inside Hardened
Stainless Steel Does It!
BALANCED STRAIGHTWAY STOP VALVE
Just a look inside shows the spindle and the seat are made of hardened stainless steel for greater wear resistance. Entirely suitable for positive shut-off service in hydraulic systems.
R. D. WOOD HYDRAULICALLY
Take a Look Inside . . .
See why they're RUGGED
HIGH PRESSURE HYDRAULIC OPERATING VALVE
Designed to be rugged. Added is hardened stainless steel trim where it is needed most. An operating valve made for heavy mill-type service with only a minimum of maintenance.
The "Why" of Extreme Long Life . . .
isn't Skin Deep
THREE-WAY BALANCED SPINDLE TYPE VALVE
Look below the surface, the seating elements are of hardened stainless steel . . . to resist wear, corrosion and erosion to an incredible degree. For high pressure service . . . easily operated.

Ask us to send you the inside story of these high pressure valves . . . write for latest Valve Data Sheets.

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

EST. 1803 R.D. Wood Company PUBLIC LEDGER BUILDING, PHILA. 5, PA.



wire cloth

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Wire cloth should be "tailor made" to meet *all* the various special uses of the automotive industry *satisfactorily.* Whatever the requirements—whether weave, mesh or finish of the cloth... or the metal, alloy, temper, flexibility, workability or diameter of its wire—Reynolds engineers, metallurgists and weaving experts can and will design and weave it *to your specifications!* Consult them at no cost or obligation. Send today for your copy of Reynolds new thirty-two page catalog.

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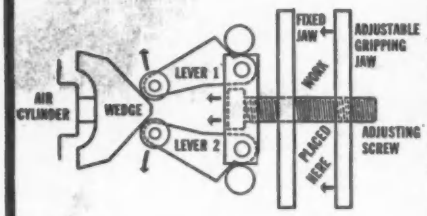
REYNOLDS WIRE CO.

DIXON, ILLINOIS

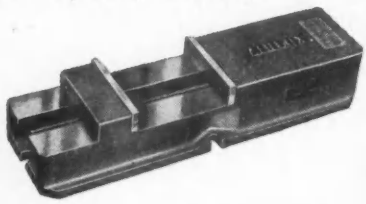
The AIRLOX guts

THE GUTS

This diagram of the patented Senior AIRLOX linkage shows the wedge and lever utilizing total cylinder drive.



The wedge, driven by the air cylinder, forces the levers apart on their fulcrums to pull the gripping jaw toward the work and fixed jaw. Adjusting gripping jaw and stroke permits locating work with assured operator safety.



THE S-13 PNEUMATIC VISE

The AIRLOX Model S-13's quick power stroke speeds production.

For most machine and bench work. Timing of jaw movements with machine used provides automatic operation. B. & S. jaw hole spacing, or your own, allows using your present jigs and fixtures. Enclosed against chips and cutting oils. Carefully ground jaw faces. Special alloy construction. Accurately flanged and keywayed. *Hydraulic drive optional.*

SPECIFICATIONS

Overall: 5¼ x 8⅜ x 29 in. Weight: 130 lb. Stroke: 1/16 to 1/2 in. Jaw-face size: 7 x 1¾ in. Maximum space between jaws: 12 in. Gripping force: air-line pressure times 90. *Increased pressure optional.*

Write for data sheet S-13.

production devices, inc.
Whitehall, New York

AIRLOX: The complete line of pneumatic and hydraulic vises

cu ft capacity. Standard tires are 7.00-17, 6-ply rating singles, which permit a GVW rating of 6700 lb for the chassis. The maximum tire equipment available for the Model 3942 is 7.00-18, 8-ply rating with dual rear tires, which permit a maximum GVW rating of 10,000 lb. The new four-speed Syncro-Mesh transmission with conventional gearshift is standard on this model.

Features of both chassis include—foot operated parking brake, solenoid starter with dash button control, and a special 19.8 to 1 semi-reversible recirculating ball worm steering gear. A closed type vacuum operated crankcase ventilating system removes destructive gases and minimizes engine sludge frequently encountered in city delivery work, where the engine operates at idling speeds for extended periods. Ride stabilizers are standard equipment on the front of the chassis and are available for the rear with certain wire combinations. Frames are extra long for full body support and for direct attachment of rear bumpers. The engine used in both models is the Chevrolet Thriftmaster 216.5 cu in. displacement with updraft craburetor. Fuel tank is of 16-gal capacity. Both chassis use the standard Chevrolet truck rear axle having a ratio of 5.14 to 1.

CALENDAR

Amer. Roadbuilders' Assoc. Road Show	Chicago	July 16-24
Texas Soaring Assoc. S. W. Soaring Contest, Grand Prairie, Texas		July 23-Aug. 1
Nat'l. Auto. Aces. Assoc., Convention & Show,	Chicago	Aug. 9-12
SAE West Coast Mfg.,	San Francisco	Aug. 18-20
Wisconsin Centennial Automotive Expo.	Milwaukee	Aug. 27-29
Natl. Air Races,	Cleveland	Sept. 4-6
SAE Tractor & Diesel Eng. Mfg.	Milwaukee	Sept. 7-9
Soc. of British Aircraft Constructors Annual Air Show,	Farnsborough	Sept. 7-12
International Foundry Congress,	Prague	Sept. 12-19
Instrument Soc. of Amer., Natl. Instrument Conf. & Exhibition,	Philadelphia	Sept. 13-17
Industrial Experimentation Training Conf.,	Columbia University	Sept. 14-18
Turin (Italy) Auto Show		Sept. 15-26
Natl. Assoc. of Foremen Convention & Silver Anniversary,	Phila.	Sept. 23-25
3rd Natl. Plastics Expo.,	New York City	Sept. 27-Oct. 1
Commercial Motor Transport Show,	London	Oct. 1-9
SAE Aeronautic & Aircraft Eng. Display,	Los Angeles	Oct. 6-9
Paris Auto Show		Oct. 7-12
Inst. of Traffic Engineer Annual Mtg.	Phila.	Oct. 11-13
SAE Production Mtg.,	Cleveland	Oct. 21-22
Amer. Welding Soc. Annual Mtg.,	Phila.	Oct. 25-29
Amer. Soc. for Metals Nat'l. Metal Congress & Expo.,	Phila.	Oct. 25-29
London Passenger Car Show		Oct. 27-Nov. 6
Society of Motor Mfrs. International Motor Exhibition,	London	Oct. 28-Nov. 6
Amer. Soc. Body Engineers, Annual Convention,	Detroit	Nov. 3-5
SAE Fuels & Lubricants Mtg.,	Tulsa	Nov. 4-5
Automotive Service Industries Show, Navy Pier,	Chicago	Dec. 6-10
SAE Annual Mtg.,	Detroit	Jan. 10-14
Natl. Auto Dealers Assoc. Convention & Equip. Exhibit,	San Francisco	Jan. 24-27

"Good Cutting Oils Sure Keep You Out of Trouble"

...says
"CHIP" WRIGHT

"Whenever there's trouble with tools or finishes or jobs fall behind schedule, the first thing I check is the cutting fluid, because when that's not exactly right, it's surprising how it can upset the whole job. You just can't get around it, cutting oils do make a big difference ... and it isn't smart to quit trying until you find the right one. It doesn't make sense to put up with headaches that can be avoided. That's why I think it pays to rely on experienced cutting oil people. They come up with sound, practical assistance."

Here's a Practical Tip:

For Your *Toughest* Jobs Try THREDKUT

You've heard of THREDKUT and what it has accomplished on tough jobs where other oils have failed. The stabilized balance between its uniformly high anti-weld value and its other desirable cutting characteristics, make it especially efficient in the machining of tough, stringy metals ... and for the more difficult operations such as thread cutting, tapping, broaching and gear shaping. Here's a cutting fluid that can help you. For complete information, write for the THREDKUT Booklet.

Another Time-Tested Stuart Product

STUART *oil engineering goes with every barrel*

D.A. Stuart Oil Co. LIMITED
EST. 1855

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cuts Production Costs with

LAKE ERIE Hydraulic Press

Eliminates patterns... machine work and expensive castings

A good example of the way in which modern hydraulic presses make it possible to improve product quality and decrease manufacturing costs is provided by American Machine and Metals, Inc., of East Moline, Illinois. Formerly, the pedestals and shell for the Atlas Laundry Extractor, manufactured for their Troy Laundry Machinery Division, were made of cast iron. Now they are formed out of sheet steel. American Machine and Metals point out the following advantages for this type of construction:

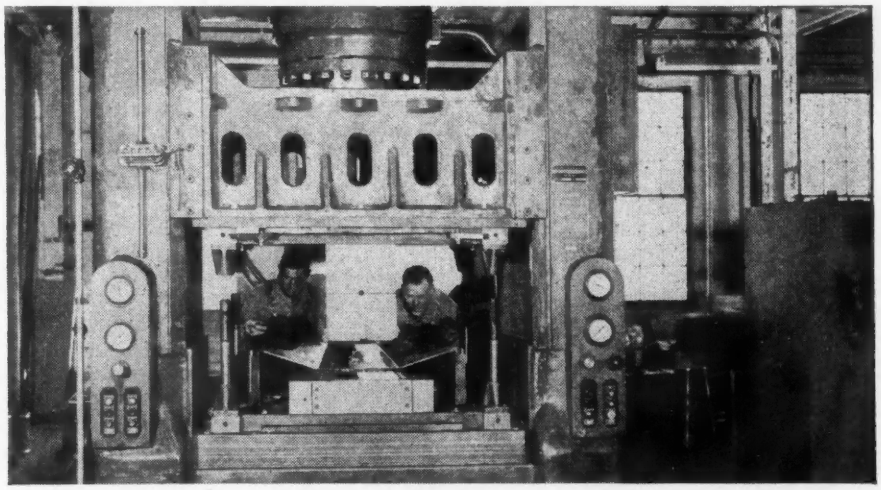
FLEXIBILITY
of machine proper, eliminating rigidness, strain and resultant breakage.

STRENGTH
allowing use of lighter material for less over-all weight of given part.

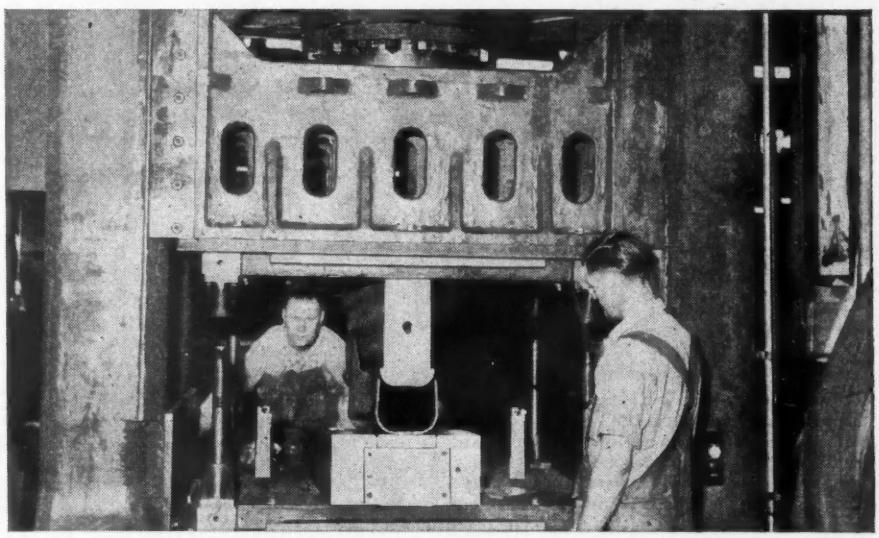
TIME SAVING
Hydraulic press does job in one operation.

COST SAVING
eliminates patterns, machine work, welding, expensive castings, complicated fabrication, cuts labor costs.

Lake Erie Hydraulic Presses have made it possible to improve product quality and decrease manufacturing costs in hundreds of plants. It will pay you to study your production methods ...to determine if they can be performed better at less cost by modern Lake Erie Hydraulic Presses.



Locating a pedestal prior to forming. American Machine and Metals report that this Lake Erie Hydraulic Press can be set up quickly, is fast on production and has lowered manufacturing costs.



Formed pedestal about to be removed from press. The Lake Erie Press is extremely accurate, turns out uniformly high quality products and reduces rejects says American Machines and Metals.

● Leading manufacturer of hydraulic presses—all sizes and types—metal working... plastics molding... forging ...metal extrusion... processing... rubber vulcanizing... stereotyping... special purpose.

LAKE ERIE
ENGINEERING CORP.
BUFFALO, N.Y. U.S.A.

LAKE ERIE ENGINEERING CORP.

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HYDRAULIC PRESSES AND SPECIAL MACHINERY

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Nash 1949 Production

(*Continued from page* 33)

framing operations is an old story with Nash, and since this technique has had wide acceptance in the body industry it may be of interest to compare notes. Checking of plant engineering records shows that the merry-go-round assembly lines for the roof and the right- and left-hand "Unisides" have been in operation since 1938 when they were established for the 1939 model run. The huge merry-go-round for the main framing of the entire body was installed in 1940 in preparation for the 1941 season.

Since it is premature at this time to discuss the set-up for building 1949 bodies, this study is confined to some brief comment on a few items of new equipment. Impressive both in size and modernity is the battery of seven big presses constituting the rear quarter panel stamping line. At the head of this line is a huge Hamilton triple-action press. The squat massive profile presented to view belies its actual size since most of the mechanism is housed in the deep pit, the action being up-side-down actually. With its 180-in. bed, this press can be used for roof stampings as well, if need be. From the standpoint of power rating, it exerts 950 tons on the ram, 550 tons on the blankholder, and 750 tons for the third action.

Next in line is a new four-point, 136-in. bed Cleveland press of single-action type, rated at 450 tons.

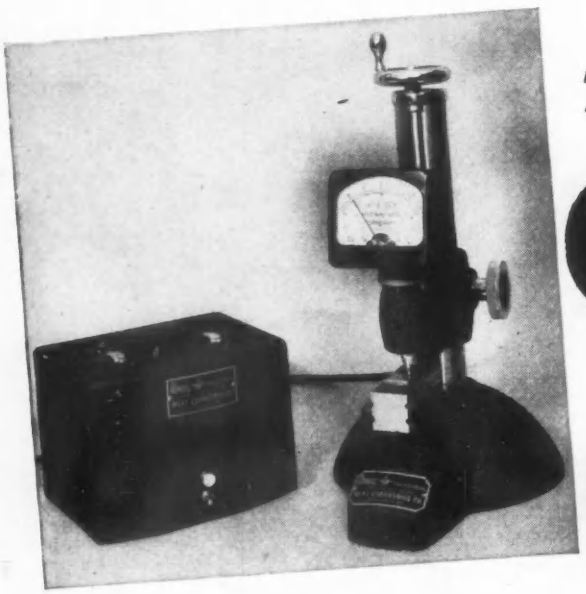
The remaining five presses represent the latest models developed by Bliss. They comprise the following: two, 108-in. bed, four point presses, rated at 315 tons; two, 124-in. bed, four-point presses, rated at 500 tons; and one, 84-in. bed, two-point press, rated at 220 tons. All are of single-action type.

A battery of four new Clearing presses has been installed to handle the door clinching operation, replacing the hand methods used heretofore. This group boasts two, 124-in. bed, four-point presses rated at 500 tons; one, 160-in. bed, four-point press rated at 500 tons; and one, 84-in. bed, two-point press rated at 250 tons.

Disposed in other sections of the press shop are several additional Hamilton presses and a number of Cleveland presses, including one, 180-in., and one, 136-in. single-action type. There is also an Erie hydraulic double action press—the only hydraulic in the plant—rated at 1000 tons.

In keeping with modern practice Nash has employed a Budd-McKay stretcher leveler for processing all deep-drawn sheets. The older machine has been supplemented by a brand new model—an enormous and expensive piece of equipment capable of rolling sheets 90 in. wide.

This brief resume of new equipment will be followed later with a high-spotting of some of the major features of the changeover for building the 1949 bodies which promise to have unusual design and constructional detail.



Merz *New-Tronic* Comparator
Available in four models.

1 Speed

2 Accuracy

3 Flexibility

Merz NEW-TRONIC Gaging Equipment

Gives All Three!

Merz *New-Tronic* equipment offers exceptional speed and accuracy—as well as cost-cutting flexibility—on a wide range of gaging and sorting operations. Manufactured and sold exclusively by Merz, under famous electronic patents acquired from Jack & Heintz, *New-Tronic* equipment is available in three types:

MERZ NEW-TRONIC COMPARATORS: For external measurements. Four models, with fixed or adjustable work-contact pressure. Each model is equipped with two magnification scales.

It will pay you to get complete information on these high-speed precision units, as well as on other types of Merz equipment. Write for full details.

MERZ NEW-TRONIC HEIGHT GAGE: Furnished complete with stand, which is equipped with *fine-adjustment* for speed and convenience in operation. Gaging head mounting is provided with a standard A.G.D. lug, making unit readily adaptable for use with existing fixtures.

MERZ NEW-TRONIC BALL SORTING MACHINES: Two standard models. Model A handles balls from 3/32″ to 7/32″, in graduations of 1/32″. Model B handles sizes from 3/16″ to 1/2″, in graduations of 1/16″. Both make ten selections automatically, to an accuracy of ten, twenty or 50 millionths. Special shims are available for other increments. Speed of both models is 3,600 balls an hour.

MERZ ENGINEERING COMPANY • INDIANAPOLIS 7, INDIANA

New-Tronic Gaging and Sorting Equipment—New-Matic Measuring Machines—A.G.D. Standard and Special Gages—Tools and Special Machinery—Experimental Projects.

MERZ

Tucker Features

(*Continued from page* 50)

gine is at idling speed. It is also stated that cars with this transmission will "push start" at 10 mph.

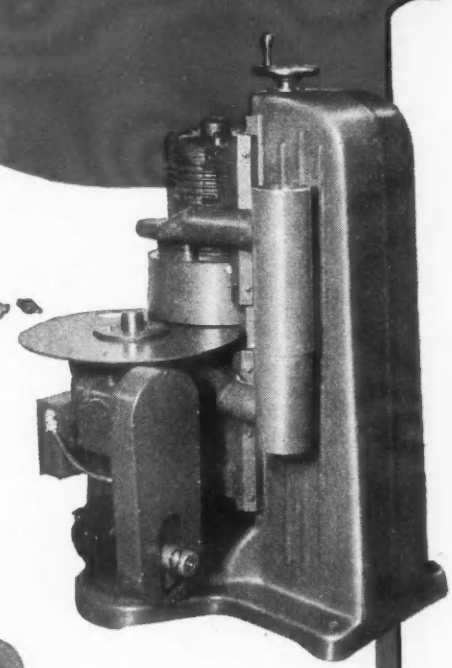
Tucker revealed that he has offered the automatic transmission to one other automobile manufacturer and will make it available to others either under a direct license or by license to their supplier. He added that his company is considering manufacture of the transmission with an adapter for other cars previously built.

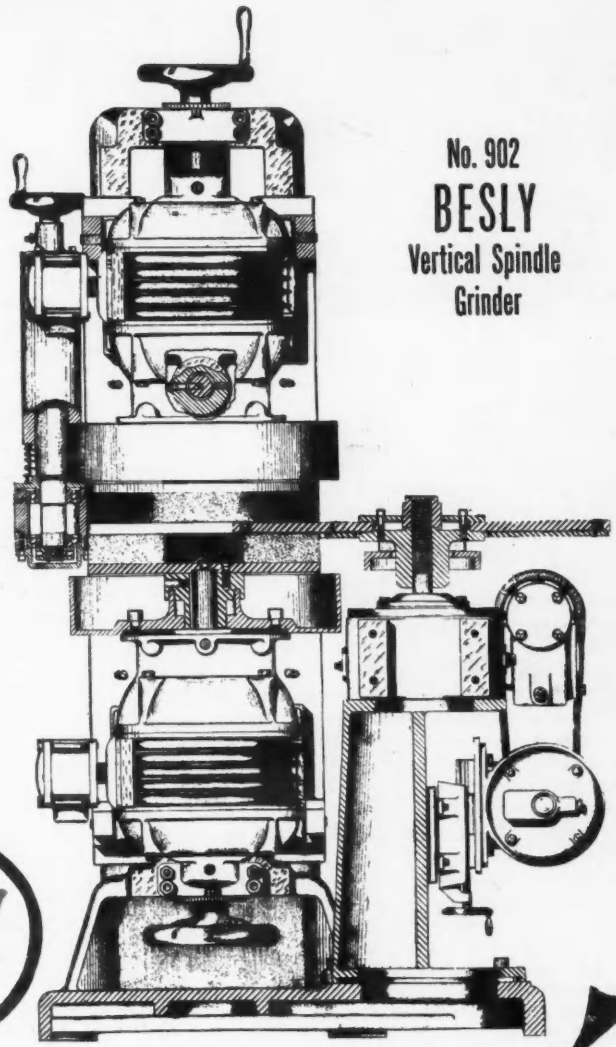
At present Tucker contemplates as standard equipment a four-speed

(*Turn to page* 92, *please*)

CERAMIC *and* PLASTIC PARTS, *TOO*

ARE GROUND WITH SPEED AND ECONOMY ON BESLY'S "902"





No. 902
BESLY
Vertical Spindle
Grinder

BESLY
GRINDERS

WRITE FOR SPECIAL BULLETIN!

Ask for your copy today. An adaptation of the "902" may be the answer to your production needs. To check possibilities, talk to a Besly engineer.

This *high-output* Besly Vertical Spindle Grinder—*originally designed for precision grinding of small coil springs*—handles a large variety of small ceramic and plastic parts. It provides a better finish—*plus faster production and minimum grinding costs.* The unusual versatility of this machine is demonstrated by its use also for finishing springs, washers and many other small parts. Simple loading and gravity unloading speeds the production rate.

You'll Do BETTER with BESLY

BESLY GRINDERS AND ACCESSORIES
BESLY TAPS • BESLY TITAN ABRASIVE WHEELS

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Factory: Beloit, Wisconsin

Silicone News

DC SILICONES

You're Using Silicones Now

These materials were industrial infants five years ago. They have suddenly come of age. Even those of us who nursed them along are amazed at how far they have already gone. Today almost everybody benefits from Silicones in his every day living. For example, Dow Corning Silicones are now being used in every new car on the road, and in the automotive industry a new material must justify its cost to a fraction of a cent by increasing life or improving performance.

For Example: DC 200 Fluid damps vibrations of ammeters, gas gauges, speedometers, to give you more accurate readings—winter or summer.

For Example: DC 200 Fluid makes practical for the first time a viscous torsional vibration damper for automobiles and diesel engine crankshafts.

(DC Silicone Fluids have less tendency to thin out at high temperatures or to thicken at low temperatures than any other liquids usable for this purpose.)

For Example: DC Silicone Fluid, an ingredient of many heavy duty motor oils, stops foaming of the oil in the crankcase.

For Example: DC Silicone Fluid is used to prevent silking and flooding of some automotive finishes.

For Example: DC Mold Release Emulsion No. 35 simplifies production and improves quality of tires, mats, and other mechanical rubber parts.

These Silicone Fluids are only one of the forms in which DC Silicones are made. Many other automotive uses for DC Silicones are under development —Silastic* for gaskets, Silicone Greases for permanent lubrication, Silicone Resins for electrical insulation and for longer lasting protective coatings.

Silicones have been in commercial production at Dow Corning for nearly five years. They are basically different materials and often give unexpected advantages that can be discovered only by trying them. We have helped put them to work at a variety of jobs in industries of nearly every kind. Additional information and engineering assistance are available. Telephone the branch office nearest you or write for Catalog M1-16.

*TRADEMARK FOR DOW CORNING SILICONE RUBBER

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MIDLAND, MICHIGAN
New York • Chicago • Cleveland • Los Angeles
Dallas • Atlanta
In Canada: Fiberglas Canada, Ltd., Toronto

Dow Corning
FIRST IN SILICONES

synchromesh transmission with overdrive gear in fourth, using a conventional clutch. However, this unit will be equipped with a pre-selector type shift lever connected with an electro-controlled vacuum power cylinder to effect the shift automatically as pre-selected. This is reminiscent of pre-selection devices offered some years ago at the time that gear shift levers were being moved under the steering wheel.

Both types of transmissions incorporate a differential in the gear box for dividing power to the individually-sprung rear wheels. Power is transmitted to each wheel through a short shaft having conventional universal joints at each end.

Conventional four wheel hydraulic brakes are standard equipment, the disk brakes originally proposed having been discarded for reasons of cost and design problems.

The suspension too has been changed from its original conception. Tucker has independent suspension all around, but suspension elements are not similar front and rear, the rear suspension having a long lever arm instead of a wishbone element. At the rear the suspension lever from the wheel terminates in a torsion bar on each side, using rubber in torsion. The rear torsion bars are relatively short and at the inner end connect to direct-acting shock absorbers through a lever arm. The front suspension also uses a rubber torsion bar connected to a direct-acting shock absorber. The original suspension system had the same elements all around with rubber rings on each end of the pivot pin, and without shock absorbers.

Body and frame construction remain the same as originally announced. The "Cyclops" eye, a third sealed-beam headlamp mounted in the center of the grille and above the level of the other headlamps, is continued. It is linked with the steering mechanism and turns with the front wheels to illuminate curves in the highway. Incidentally the electrical system is more in keeping with conventional practice, the 24-volt system being discarded for the present.

Suspend Operations

As we go to press President Tucker announced that the company would suspend operations temporarily owing to the demand of the Securities & Exchange Commission that the company records be produced for examination. In May the SEC charged at a hearing in Washington that the company's original registration statement, supplemental prospectus, and 1947 annual report contained untrue statement of material fact. At last report the investigation was to be made at Tucker's Chicago plant, with records from the Tucker New York and Canadian offices brought to Chicago.

with HAVEG

If you need a non-metallic material with physicals such as strength, toughness, and durability PLUS 100% corrosion resistance, investigate HAVEG.

This versatile molded material, resistant to chemical action *throughout its entire mass,* is ideal for structural uses. Tanks, towers, and other large structurally strong equipment can be molded in one piece at nominal cost and delivered in from one to eight weeks.

For complete information on how this unusual material can help improve performance and reduce costs on your applications, drop us a line for HAVEG Bulletin F-5.

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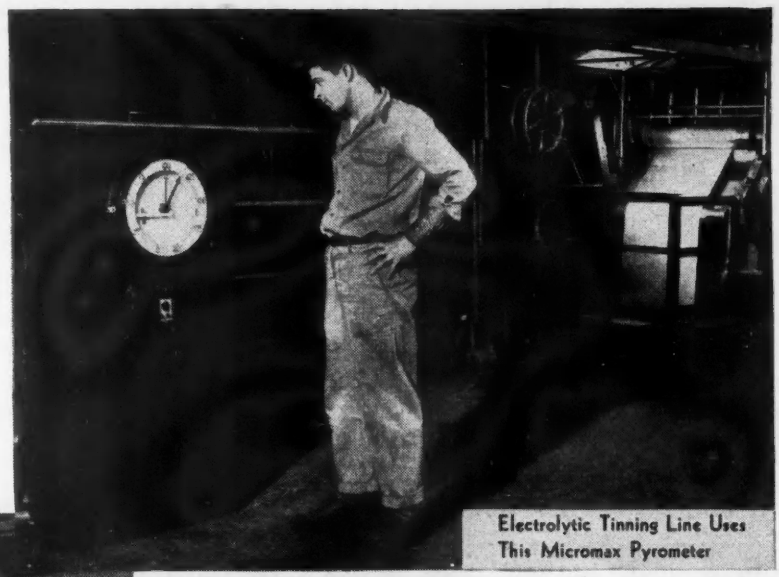
MICROMAX Does Many Jobs for Weirton Steel Co.



Electrolytic Tinning Line Uses This Micromax Pyrometer

Internal and Recuperator Temperatures of an S. C. Co. Slab Furnace Are Controlled by These Micromax Instruments

Temperature of Hot Dip Galvanizing Bath is Controlled by These Micromax Pyrometers

The three processes pictured above are typical of the great variety of operations controlled by Micromax pyrometers at Weirton Steel Company.

Micromax Equipment has many features which make it suitable for large or small plants, but probably the most important is its versatility. In its Control function, Micromax can regulate any controllable process, at any temperature from freezing air to boiling steel. In its "informing" function, Micromax supplies record charts in round or strip-form, indicates temperature on either of two types of scale, and can "wink, ring or holler" as warning in an emergency. It can combine functions as you wish—can indicate, record and control; indicate and record only; indicate and control only; or it can just control, though the trend is to the more complete operations.

In providing fully automatic regulation, Micromax offsets the effect of changes in ambient temperature, flow of work, and other upsetting factors with extreme promptness and accuracy. A large part of Micromax success rests not only on what it does, but also on the sensitive and dependable way in which it operates.

For further information, write to Leeds & Northrup Company, 4966 Stenton Avenue, Philadelphia 44, Pa.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · AUTOMATIC CONTROLS · TELEMETERS
HEAT-TREATING FURNACES

Jrl. Ad N-33-680(1)

NEW PRODUCTS

(*Continued from page* 54)

P-25—Automatic Hill Holder

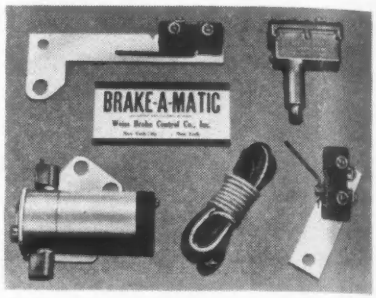
Newly-available from Weiss Brake Control Co., Inc., New York City, is Brake-A-Matic, a fully automatic hill-holder and creep-stopper for passenger cars. This device is said to safely lock the brakes under any road conditions after the car has been brought to a stop.

Brake-A-Matic is designed for hydraulic shift transmission cars. With it, a car, once stopped, won't roll, either going up hill or down, no matter how steep, and it won't creep, claim the manufacturers.

Brake-A-Matic functions only when the car comes to a stop. Releasing accelerator pedal or braking the car to a slow-down while driving does not initiate its action.

With a vehicle at rest, accelerator pedal in released position, and ignition switch on, the Brake-A-Matic electrical circuit is closed, energizing a solenoid valve attached to the master brake cylinder. This closes the valve, preventing return of brake fluid from the wheel brake cylinders to the master cylinder.

This pressure-trapping action holds the brakes in "on" position. When the driver wants to move forward, he depresses the accelerator pedal.



Weiss Brake-A-Matic, a fully automatic hill-holder and creep-stopper

This opens the Brake-A-Matic electrical circuit, de-energizes the solenoid valve, and releases the brakes.

While the car is in motion, a governor or pressure switch keeps the circuit open, even with the accelerator pedal released and brakes applied. The solenoid valve will not be energized until the vehicle comes to a stop. Heart of this automatic braking aid installation is the governor switch.

Brake-A-Matic is now available for six and eight cylinder Chrysler and DeSoto cars, 1946, 1947, and 1948 models, and will be available for 1949 Chrysler and DeSoto models when they are introduced. It is soon to be available for Oldsmobiles, Pontiacs, and Cadillacs equipped with the Hydra-Matic transmission. Plans are now under way to adapt Brake-A-Matic to the Buick with the Dynaflow transmission.

P-26—Light Flexible Air Hose

A new highflex air hose for small tools, which weighs less than half as much and is said to be stronger than the ordinary hose used in this service, is being marketed by the B. F. Goodrich Co., Akron, Ohio.

The hose is as flexible as a lamp cord because of its light weight and other construction features, the company says, and its cover is an attractive high-visibility red.

It allows easier handling, the great decrease in weight making the tool line easier to move, it works better in close quarters and in pulling around corners, and it resists kinking, the company further declares.

The new hose in the ¼ inch size weighs only 8.8 pounds per 100 feet, while the same size hose of ordinary design weighs 20 pounds for the same length. Similar savings are made in all sizes.

(*Turn to page* 98, *please*)

ROCKFORD

SPRING

LOADED

CLUTCHES

LIGHT PEDAL PRESSURE
CUSHIONED ENGAGEMENT
VIBRATION DAMPENING *
ACCURATE BALANCE
DIRT EXCLUSION
HEAT DISSIPATION
LIFETIME ADJUSTMENT

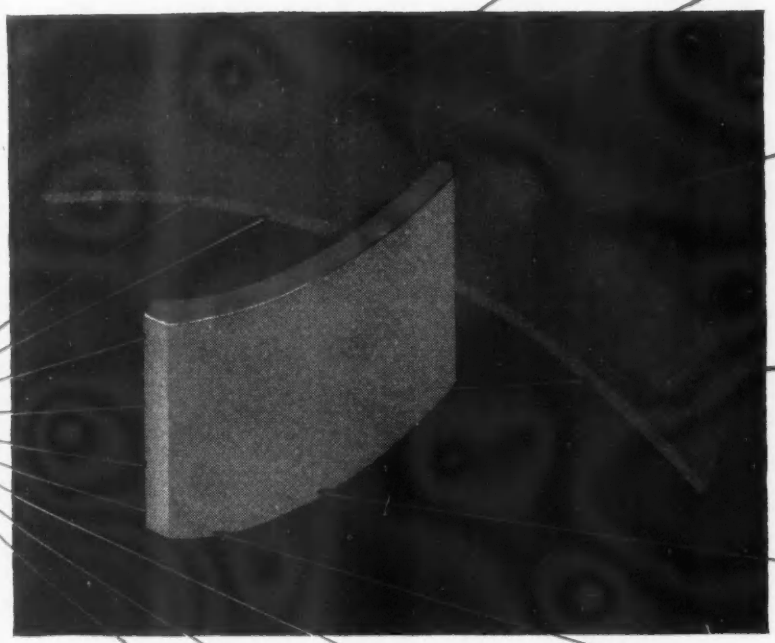
* Vibration dampeners in ROCKFORD Spring-Loaded CLUTCHES blot out most of the torsional vibration in car, truck and tractor power transmission lines. The dampener springs are completely housed. Sturdy lugs protect against damage by shock loads and overloading. An adjustable friction snubber controls recoil and provides cushioning action.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

ROCKFORD CLUTCH DIVISION BORG-WARNER
315 Catherine Street, Rockford, Illinois, U.S.A.

Some of the many R/M Brake Linings Available to you



Extruded—A homogeneous asbestos pulp material, extruded and cured under extremely high pressure. Used for passenger cars and light industrial applications.

Wireback—A homogeneous asbestos pulp material, wire reinforced, and calendered under extremely high pressure. Available in flexible roll lots and rigid segments. For use on automotive and light industrial applications.

Dry Process (*patented*) — Asbestos bond and friction modifying ingredient mixed and processed dry, hot pressed, and densely cured to arc and size. Used in all types of application for light and heavy-duty automotive and industrial equipment. Available in special shapes.

Folded & Compressed—A plied and impregnated asbestos and metallic cloth, built up to required size and press-cured to high density. For general use on flexible and semi-flexible bands and rigid shoes. For industrial and automotive purposes.

Woven—An asbestos wire yarn woven into tape, treated and cured. Treatment and type of yarn vary with different applications. For general industrial and automotive use.

Sheeter—A bonded asbestos pulp material, built in sheets on a hot roll, cut and cured to shape. For general use in automotive and light industrial applications.

Millboard—Made on wet board machines, treated, formed and cured. Treatment varies with the application. For automotive and industrial use.Available in many special shapes, including cones.

Powdered Metals — Full metallic; made of highly compressed powdered metals and fused. Usually furnished with a steel reinforced back. Used principally on heavy-duty industrial applications.

Semi-Metallic—Asbestos and powdered metal bonded with synthetic resins, press cured and finished to size. Used for both automotive and industrial applications.

Put your most critical braking problems up to your R/M Engineer. At R/M, you have your choice of a variety of friction materials, unmatched anywhere in the world. Many of these materials were developed, and are made exclusively, by R/M. These materials can be combined, or new materials developed, to meet your requirements.

At R/M you will benefit from a unique engineering service which integrates the work of four great manufacturing plants, each with its own experimental laboratories and each with its own engineering department.

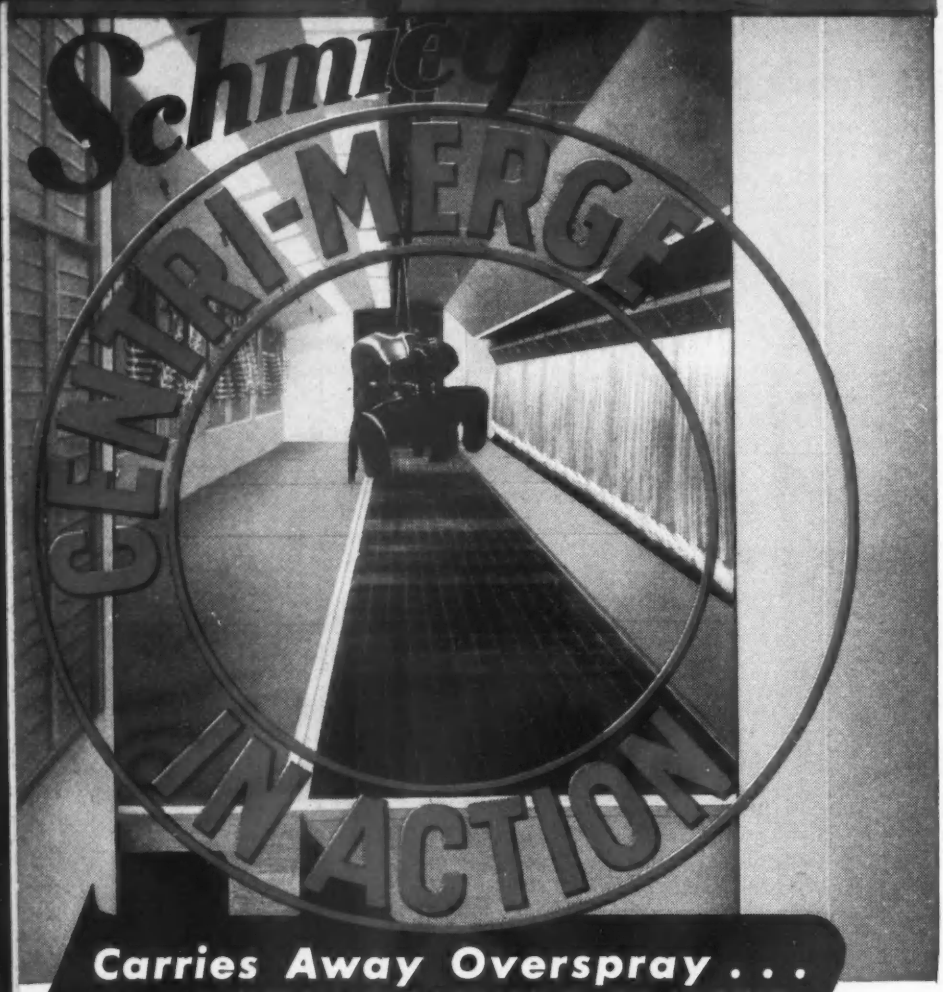
Send for a free copy of our illustrated Technical Bulletin on Brake Linings & Blocks. It contains a complete factual description of each of R/M's many brake lining materials, with detailed recommendations. For further information on linings . . . or on R/M clutch facings . . . see your R/M representative, or write direct to headquarters.

RAYBESTOS-MANHATTAN, INC.

EQUIPMENT SALES DIVISION

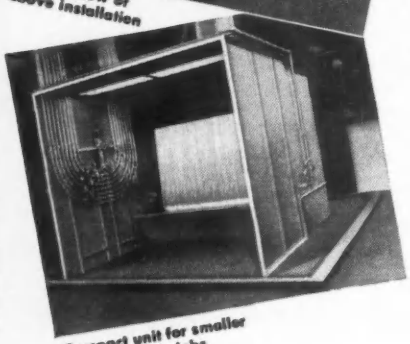
620 FISHER BUILDING, DETROIT, MICHIGAN

Factories: Bridgeport, Conn. • Manheim, Pa. • Passaic, N. J. • N. Charleston, S. C.



Carries Away Overspray . . .
IN A WHIRLING TORNADO OF WATER

Exterior view of above installation



Compact unit for smaller spraying jobs

PAINT-LADEN AIR IS "TORNADO" CLEANED. Operators, working in a Schmieg Centri-Merge Spray Booth, are adequately protected from fire and fumes. Overspray is carried on an air stream *horizontally* away from work into a curtain of water, pressure-fed through slots extending continuously full width of booth, that descends down the flood sheet. The mixture of fume and paint-laden air and water is then whirled under the flood sheet and hurled with tremendous impact against the impingement wall at back of booth. Down this impingement wall flows an additional sheet of water that floods the foreign matter, pounded out in the process, into the sludge tank below. Only CLEAN AIR passes through exhaust fan. Thus the danger of fire is suppressed both in front and behind the flood sheet. Because the ratio of water and air is far greater in Centri-Merge, paint and other gummy substances do not pile up on the hard-to-get-at walls of the chamber behind the flood sheet; therefore, cost of repeated cleanings is eliminated.

Consult Schmieg engineers regarding your problems of dust and fume control.

THE *best* AIR PURGE *is* CENTRI-MERGE

Schmieg INDUSTRIES INC.
Engineers & Manufacturers
310 PIQUETTE AVENUE • DETROIT 2, MICHIGAN

New Products

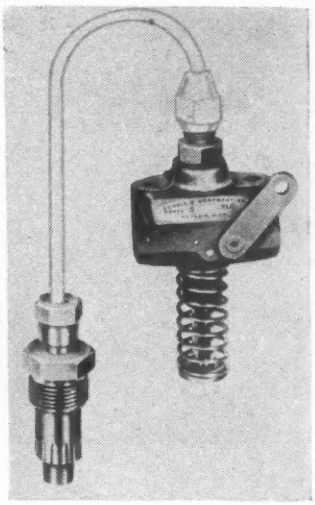
(*Continued from page* 94)

Oil proof, inside and out, the new hose is not affected by lubricating oil, will not swell to cut air pressure or volume, and will not flake off and cause the tool to jam or choke the rubber particles.

Working pressures with the new hose go as high as 250 pounds per sq in. with safety.

P-27—Pump For Diesel Engines

A new and simplified single cylinder pump for diesel engines in the five to 15 hp range is announced by Ex-Cell-O Corp., Detroit, Mich. The pump, designated Model "S", is to be used for one- and two-cylinder



Ex-Cell-O pump for Diesels, Model "S"

small high-speed Diesel engines and is available in a range of plunger diameters from ¼ in. to ⅜ in.

The combination of this new pump and the Ex-Cell-O nozzle is said to afford a reliable injection system for small engines. The Ex-Cell-O nozzle eliminates drain lines. Illustration shows the new single-cylinder pump fitted with an Ex-Cell-O nozzle and holder assembly of the threaded type.

P-28—Fluid For Torque Converters

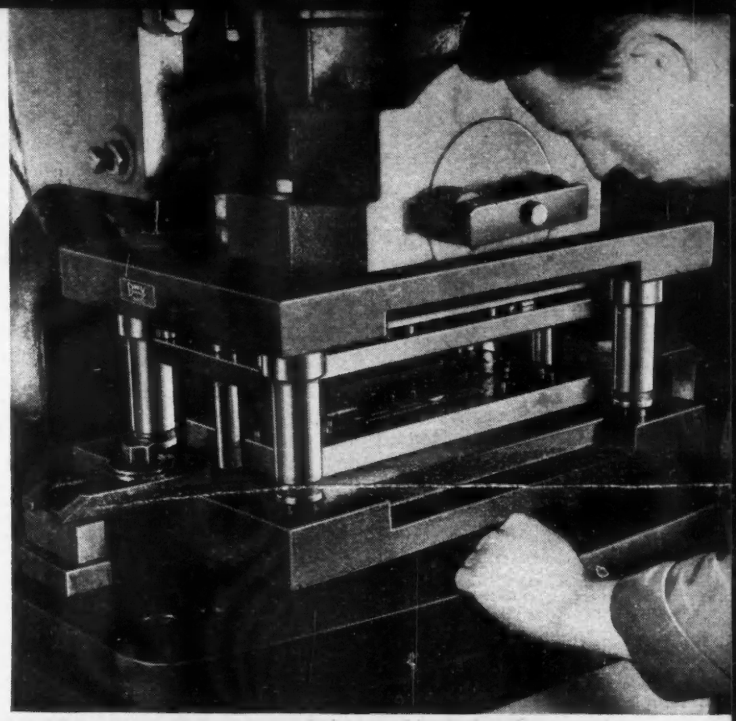
Socony-Vacuum Oil Co., Inc., New York, N. Y., presents Mobilfluid 62, claimed an improved hydraulic fluid for use in torque converters for buses to provide smooth acceleration.

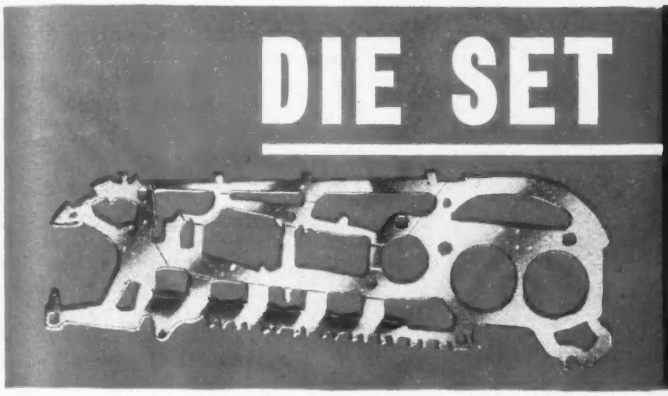
The new product is described as having high chemical stability and great resistance to oxidation; to be light-bodied, with good viscosity index, high lubricating value, and to retain fluidity at as low as −40 F.

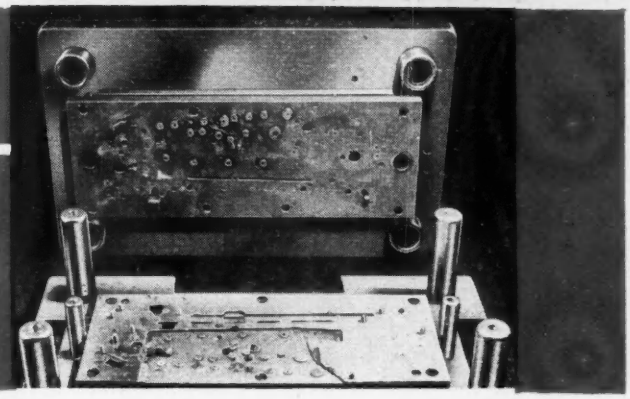
Precision stampings at Felt & Tarrant speed assembly of Comptometers

tolerances of 0.0005" held on 65 holes

. . . using DANLY PRECISION DIE SET







produces 23,000 steel stampings per grind

Here is a Danly Precision Die Set employed by Felt & Tarrant Mfg. Co. of Chicago to produce frame plates for comptometers—high-speed adding-calculating machines.

The die illustrated is mounted on a four-post Danly Standard Semi-Steel Precision Set. It trims, pierces, and notches 65 holes in .035 cold rolled strip steel. The work-piece is hand fed and positioned on dowel pins. A two-post stripper is used to prevent distortion. Production averages 23,000 pieces between grinds. Typical of other stampings produced for comptometers with Danly Die Sets, tolerance of .0005" on each hole is maintained which speeds assembly line work and permits complete interchangeability of parts.

Here again is evidence of the inherent accuracy of Danly Precision Die Sets under actual press operating conditions. Built to precision tolerances (guide posts and bushings ground to limits of .0002") they permit taking full advantage of the die maker's precision, help you hold close tolerances and get longer tool life.

Danly has a wide range of standard stock sizes available which can be quickly assembled and delivered to help you save time and money.

Danly Engineering Service
Consult our engineering department for helpful recommendations on die sets—large or small, standard or special—*for any type of press operation.*

DANLY NATION-WIDE

Danly offices in 10 key cities give immediate attention to your orders. Assembly plants (marked with stars) stock interchangeable parts for quick assembly and delivery of any standard die set to your specifications.

- ★ **Chicago 50,** 2100 S. 52nd Ave.
- ★ **Cleveland 14,** 1550 E. 33rd St.
- ★ **Dayton 2,** 990 E. Monument Ave.
- ★ **Detroit 16,** 1549 Temple Ave.
- ★ **Grand Rapids,** 113 Michigan Ave., N. W.
- ★ **Long Island City 1,** 47-28 37th St.
- ★ **Los Angeles 54,** Ducommun Metals & Supply Co., 4890 S. Alameda
- ● **Milwaukee 2,** 111 E. Wisconsin Ave.
- ● **Philadelphia 44,** 18 W. Chelten Ave.
- ★ **Rochester 4,** 16 Commercial St.

★ ASSEMBLY SERVICE

get this *free* bulletin

Illustrates how Danly's Special Machining and Welding Service can save you time and money for unusual die set applications.

DANLY

DANLY MACHINE SPECIALTIES, INC.
2100 SOUTH 52ND AVENUE, CHICAGO 50, ILLINOIS

PRECISION DIE SETS... STANDARD AND SPECIAL | MECHANICAL PRESSES AND PRESS EQUIPMENT

General News

(*Continued from page* 23)

SAE Committee Studies Truck Signals

More effective stop and directional signals for trucks are expected as a result of studies being made by the SAE lighting committee in cooperation with the General Electric Co. The study was undertaken after some safety authorities called present truck signals inadequate in many cases and drivers hand signals ineffectual, especially where truck trailers are concerned. Preliminary findings indicate that lights to the rear should be preferably red, with amber permissible, and in the front, amber or white. Also recommended is that lights should be at least four in. in diameter, but need not necessarily bear printed instructions or arrows. The chief problem is obtaining sufficient lighting intensity to be effective in sunlight and at the same time not be blinding at night.

Tentative Army Ordnance Contracts Reported

It is reported that the Army Ordnance Dept. has allocated tentative contracts for military trucks and combat vehicles to automotive and other manufacturing industries. However, the contracts are not firm, but are only a preliminary step to hasten action if an emergency should arise. It is believed that the truck industry will be able to handle without difficulty any requests now contemplated for trucks and spare parts without seriously affecting domestic production. Truck types under consideration are said to be primarily the types used in the last war, with possible minor modifications.

Parts Supply Imbalance Slows Ford Output

The Ford Motor Co. has encountered the usual difficulties in bringing out a completely new model. The company was forced to shut down operations several times because of parts shortages during June. However, the parts flow is now in better balance, and the company hopes to be turning out 3700 cars a day by the end of August. Ford currently has approximately 135,000 employes —a new high. About 75,000 are employed at the Rouge plant.

Willys Sets Up Office to Handle Army Orders

Willys-Overland Motors has created a new executive office charged directly with liaison between the company and the government on plans for industrial mobilization. The post has been filled by William J. Wade, who will act as assistant to Arthur J. Weiland, executive vice-president. Willys already has considerable business with the Army, and is currently shipping military jeep engines to be used as replacements in Army vehicles. The Army has ordered 17,600 engines, and shipment will be completed by the end of this year.

D. W. Scott Joins Malone Advertising Agency

D. W. Scott, director of advertising and public relations for the Bendix-Westinghouse Automotive Brake Co., has resigned to become account executive with Norman Malone and Associates, advertising and public relations firm of Akron, O.

Hitchcock Chairman of AMA Public Relations

Hugh W. Hitchcock, director of advertising and public relations of the Packard Motor Car Co., has been elected chairman of the Public Relations Committee of the Automobile Manufacturers Association. Mr. Hitchcock succeeds Paul Garrett, vice president and public relations director of GM.

(*Turn to page* 102, *please*)

This unusually long (34-foot) semi-trailer carries cattle. The Tuthill consultants who specified the springs on it were engineers, not cattlemen, but they knew that cattle require a comfortable ride. A long, jolting, jouncing trip will cause cattle to lose valuable weight.

Therefore the Tuthill engineers provided 3 x 48-inch alloy-steel springs, with main and helper leaves. The main leaves give the smooth vibration-free ride that Bossy needs, yet the helper leaves are there to take care of unduly bad jolts. American Body & Trailer, Inc., Oklahoma City, builds this fine semi-trailer.

Tuthill engineers can give you the same expert assistance in choosing the right spring for your own bodies and frames. All Tuthill springs are stout and tough—carefully tempered under a pyrometer-controlled heat treatment from specially chosen, high grade alloy steel. Request details.

Spring design is a specialist's business. Consult our Engineering Department. There is no obligation.

WE RECOMMEND TUTHILL FOR QUALITY SPRINGS

TUTHILL
Spring Company
760 West Polk Street
Chicago 7, Illinois

Quality Leaf Springs for Sixty-Seven Years

You see wet windshields now even when the sun is shining

● The sun is shining. But look!...here comes a car with windshield wipers swinging and two tiny streams of water squirting on the glass.

It's one of the Trico Windshield Washers . . . the famous "Two Little Squirts"... which keep windshields clear for more than two million drivers of cars and trucks.

To help promote universal use of this important safe driving aid, 14 makes of cars now have built-in connections which greatly reduce installation time by car dealers or repair shops. And Buick, Cadillac, Oldsmobile, Pontiac and Lincoln Cosmopolitan make complete installations at the factory.

Trico Products Corporation, Buffalo 3, N. Y.

$6.25 plus installation

—at car dealers, repair shops and service stations almost everywhere. Consult the Automobile Classified pages of your phone book for "where to buy."

TRICO *Windshield Washers*

Fully Automatic... Nothing to Pump

General News

(*Continued from page* 100)

Air Instructor Group Names Stinson "Plane of '47"

The United States Flight Instructors Association has named the Stinson Flying Station Wagon the outstanding personal plane of 1947. The association is composed of over 3000 government-certified flight instructors.

Battery Corp. of America Formed in New Jersey

The formation of the Battery Corporation of America, manufacturer of storage batteries, has been announced by Joseph M. Saunders, president. The new company's plant, located in East Paterson, N. J., covers an area of 30,000 sq ft.

Douglas Building New Air Freighter

Already 60 per cent engineered, it is expected that the prototype of a new Douglas Aircraft Co. transport, to be known as the DC-6 Air Freighter, will be completed and flying next spring. To be capable of carrying a payload of 15 tons approximately 2000 mi or transporting 23,000 lb of freight non-stop from coast to coast, it is being designed for speeds over 300 mph. The new plane was developed from the basic design of the deluxe DC-6 airliner. The new Douglas air freighter will have an identical span of 117 ft, 6 in. and overall height of 17 ft, 3 in. Its fuselage length of 105 ft 7 in. is five ft greater than that of the passenger version. Like the DC-6, the Douglas Air Freighter will be equipped with four Pratt & Whitney Double Wasp engines each developing 2400 take-off hp, with water injection. Its 5000-cu ft cargo compartment will be pressurized and air conditioned.

Ford Orders Climb Sharply After New Model Showing

As predicted, orders for the new 1949 Ford have climbed steeply since the car was introduced to the public. The company reports that during the first three days of public showings across the country, 465,646 new orders were written by dealers. Unfilled orders on the books prior to that time totaled about 1.3 million. Ford estimates that more than 28 million persons viewed the car during the three-day showings.

Snyder New Gen'l. Mgr. of Chrysler Lynch Road Unit

Carl J. Snyder has been appointed general manager of Chrysler Corp.'s Lynch Road plant. He has been promoted from general staff master mechanic to succeed J. M. Hartgering, who died June 17. Frank J. Morisette has been named general staff master mechanic to succeed Mr. Snyder.

Ruthrauff & Ryan Name Pratt Dodge Account Executive

Ruthrauff & Ryan, Inc. have announced the appointment of Kenneth S. Pratt as account executive for the Dodge Div., Chrysler Corp.

Automotive Advertisers Hold Wholesalers' Contest

The Automotive Advertisers Council has announced a program of Annual Advertising Merit Awards for Automotive Wholesalers doing the best local advertising job. The program is designed to encourage more planned, independent advertising by wholesalers. The contest is open to any recognized automotive wholesaler at least 75 per cent of whose business is on a wholesale basis. Awards will be made in four classifications based on wholesalers' dollar volume of sales: up to $100,000; $100,000 to $250,000; $250,000 to $500,000; over $500,000. Awards will be announced each year at the Automotive Service Industries Show.

At the spring meeting, the Automotive Advertisers Council reelected W. A. Kirkpatrick, manager, advertising and sales promotion, Wilkening Mfg. Co., as president of the Council. Other officers elected were Duane Jones, advertising manager, United Motors Service Div. of GM, vice-president; R. E. Conley, Jr., advertising manager, R. M. Hollingshead Corp., Whiz Automotive Div., treasurer; and C. H. LeFevre, advertising manager, Sealed Power Corp., secretary. George Stout, formerly sales promotion manager, Perfect Circle Corp. and now head of George W. Stout, Inc., advertising and sales promotion counsel, Newcastle, Ind., was appointed executive secretary of the Council. Don L. Hague, E. I. du Pont de Nemours; P. C. Poss, Timken Roller Bearing Co.; C. C. Tapscott, McQuay-Norris; E. F. Todd, Imperial Brass; and Duane Jones, United Motors Service Div. of GM, were elected to the Council's Board of Governors for a two-year term. S. R. Robinson, advertising manager, United States Asbestos Div., Raybestos-Manhattan, Inc., was elected to the board for a one-year term.

A. Felix du Pont, Sr.

A. Felix du Pont, Sr., 69, a director, former vice president, and great grandson of the founder of E. I. du Pont de Nemours and Co., died June 29, in Rehoboth Beach, Del.

Albert J. Browning

Albert J. Browning, 47, vice president in charge of purchasing, Ford Motor Co. died on July 2 in Detroit, Mich.

James Dalton

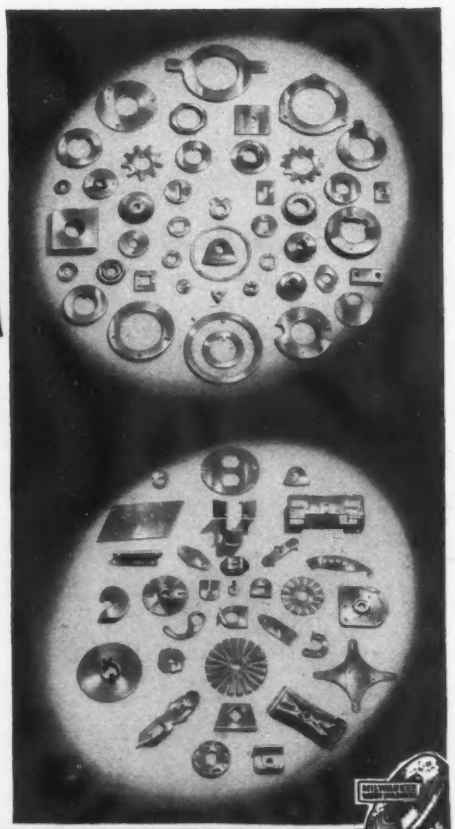
James Dalton, Editor of *Motor*, formerly News Editor, Chilton Automotive Division and, later, Editor of AUTOMOTIVE INDUSTRIES, died on July 4 in Detroit, Mich.

George W. Walker

George W. Walker, 60, director of purchasing, Lincoln-Mercury Div., Ford Motor Co. died on June 29 in Detroit, Mich.

60 YEARS OF SERVICE to INDUSTRY

SUPPLYING
WASHERS
and
STAMPINGS
OF EVERY DESCRIPTION
FOR EVERY PURPOSE...
UTILIZING MORE THAN
22,000 SETS OF DIES
Let Us Quote On Your Needs!



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THE WORLD'S LARGEST PRODUCER OF WASHERS
2212 E. BAY STREET, MILWAUKEE 7, WISCONSIN